October 1966

culture

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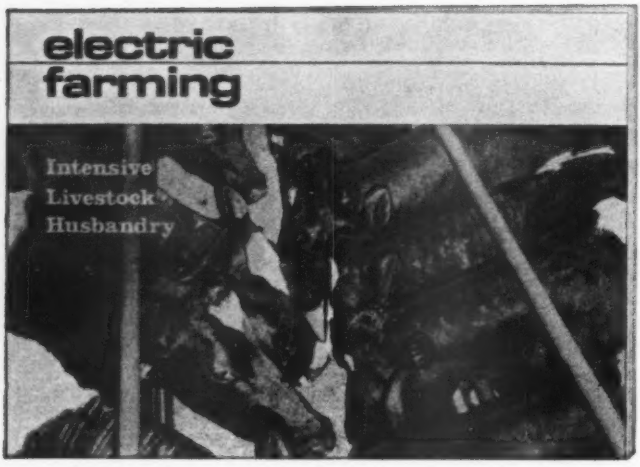
Published for the Ministry of Agriculture, Fisheries and Food by Her Majesty's Stationery Office



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Agriculture

VOLUME 73 · NUMBER 10 · OCTOBER 1966

Editorial Offices
Ministry of Agriculture, Fisheries and Food
Whitehall Place, London S.W.1. Trafalgar 7711

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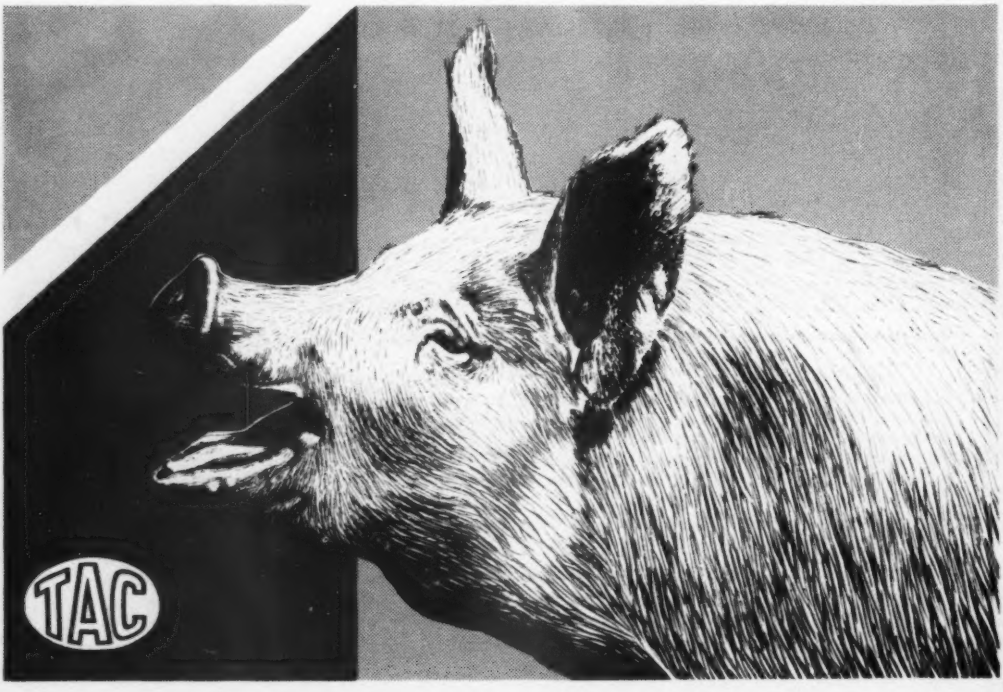


The Planning Season

WHEN the harvest is in and the holidays, if any, but a memory, most farmers look forward to the spring planting season. Before that arrives, however, there is a season, often neglected, often too difficult to face up to, but which, if properly exploited, can be more valuable than any other. The season of winter can and should be the time for planning; for critical analysis of the farm enterprises; for clear-sighted, unprejudiced assessment of profitability and efficiency. It needs real resolution and a strong, disciplined mind to get away from the daily routine, to take time to concentrate upon the important long-term issues. But any farmer who can bring himself to do this will have achieved a remarkable step forward in improving his income.

One of the first things he will probably discover is that he has inadequate basic information upon which to arrive at major policy decisions. Those accounts, laboriously and reluctantly compiled to serve the demands of the tax inspector, are of little value as a picture of the farming profitability in detail. They will not help in a decision as to whether this enterprise or that should be extended or scrapped. A session with the N.A.A.S. District Adviser may well indicate a good line of approach to remedy this deficiency.

Then there are the farm buildings. Autumn is not too early—indeed it is almost too late—to be considering the demands of next season's harvest or of stock housing for the winter after it. It always takes longer than expected to bring to completion plans for new buildings. The Agricultural Land Service will help with design and can probably suggest places where buildings of the type contemplated can be seen in use. After this there are planning and building regulation consents to be considered, detailed plans to be drawn up, and estimates obtained.

The months slip by, but set some days aside this back end for planning. It need not be a lonely job. The bank manager, the accountant, the Ministry advisers are all willing to discuss ideas and to help in formulating plans. The days of slap-dash day-to-day decisions are over. Long-term planning is not just a fashionable phrase, it is a modern necessity; and the short days and long nights are the farmer's planning season.

JOHN FOSTER

Cross Breeding of Dairy Cattle

F. John Fullbrook

VISITORS to Great Britain, looking around our countryside, are impressed by the uniformity of our dairy herds. They see herds of Friesians, of Jerseys, of Guernseys, of Ayrshires and of others, but seldom are they mixed in one herd and few cross breds are seen. It came as a surprise to visitors to the 1966 Royal Show that the combined exhibit of the Ministry of Agriculture and the Royal Agricultural Society of England should be a demonstration of crossbred dairy cattle.

For many years, some breed societies might claim centuries, our pedigree dairy cattle have been bred pure, and cross breeding has been used only to change from one breed to another. The Longhorn gave way to the Shorthorn and this, in turn, to the Friesian, now our predominant dairy breed. To some extent the increase in this breed has been achieved by multiplying pure-bred Friesians, but crossing over from other breeds by the continuous use of a Friesian bull has played the major part. Planned cross breeding to maintain a herd of cross breds is largely a new development.

Experimental work at A.B.R.O.

The Royal Show exhibit was based on research work into the cross breeding of dairy cattle which has been in progress for the last sixteen years at the Animal Breeding Research Organisation's station at Cold Norton in Staffordshire. Over a thousand cows of the Friesian, Ayrshire and Jersey breeds and their crosses have passed through this experiment. The results have shown an advantage to the cross bred in the characters of fertility and survival. Perhaps the most important advantage is in fertility. The crossing of two pure breeds has resulted in a 9 per cent improvement in fertility over the average of the pure breds, while a cross bred put to a third breed of bull has resulted in a 14 per cent improvement in fertility. This, combined with the better survival characters of the cross bred, shown by 50 per cent fewer

The Royal Show exhibit of 'Milking Jersians'

calf losses at birth, out of heifers, and 45 per cent better survival rate to one-year-old, makes the cross-bred cow worth considering.

The most interesting of the A.B.R.O. crosses was the one demonstrated at the Royal Show. This was produced by using a Jersey bull on a Friesian cow and has been variously called the Jersian, the F/J hybrid and F × J. (This, in itself, is a departure from the normally accepted practice of stating the breed of bull first, but with the A.B.R.O.'s complicated breeding pattern, this nomenclature was the most suitable.) The combination of the biggest and highest yielding and the smallest and highest milk quality breeds gives this cross its particular interest.

The place of the Jersian

The production characters of cross breds are close to the average of those of the parent breeds, milk production being perhaps slightly above. It is, therefore, on the fertility and survival characters that the cross-bred cow might have a place. Two examples are suggested.

The Friesian breed has made vast strides in the improvement of the quality of the milk it produces, but there are still farmers with a milk quality problem, as is evidenced by the odd Jersey seen in some Friesian herds. The farmer in these circumstances might consider keeping Jersians along with his Friesians. Such cross breds would have better fertility and would be more likely than Jerseys to fend for themselves amongst the bigger Friesian cows. A farmer could ensure a suitable supply of Jersians by putting a Jersey bull to his Friesian heifers and a Friesian bull to his Friesian cows; the Jersians would be crossed for beef using a Charolais or Hereford bull.

Secondly, the farmer with a flying herd might see a solution to milk quality problems by contracting for a supply of Jersians, as the purchase of cows in the open market sometimes results in buying-in other people's culls. It would be possible to arrange with a Friesian herd owner to put a Jersey bull with his heifers and to buy the calves for contract rearing, thus ensuring a supply of quiet, highly fertile, easily handled, replacement cows giving good quality milk.

The results of the investigations being made by Messrs. Spillers Ltd. into the value of the Jersian bull calf are awaited with great interest

Beef from the Jersian

Some farmers who saw the Jersians at the Royal Show were concerned with the lower return from the beef by-product if they used a Jersey bull on their Friesians. The value of the cull cow will certainly be less, and the relative value of the Jersian bull calf is under investigation by Messrs. Spillers Ltd. at Middle Aston, Oxford, who are comparing Friesians, Jerseys and Jersians under an intensive beef system: their results are awaited with great interest. The loss in value of the beef by-product is less than might be expected. There is no problem in producing reasonable beef from the Jersian female if a Charolais or a Hereford bull is used. Figures from Gleadthorpe Experimental Husbandry Farm are awaited on the value of the calf produced by a black bull from a Jersian heifer. Many farmers already use an Angus bull on Friesian heifers for easy calving and will know the local market value of the calves produced. A Jersey bull will give equally easy calving. The cost of producing a Jersian heifer calf, out of a Friesian heifer, can be calculated simply by subtracting the value of a Jersian bull calf (almost certainly Bobby calf price) from the sum of the values of an Angus cross bull calf and an Angus cross heifer calf out of heifers.

How to breed after the first cross

Probably the most frequent question asked by farmers visiting the exhibit was: Having got Jersians what bull do I put to them? This question is answered to some extent in a preceding paragraph where it is suggested that they should be 'crossed out' by using a beef bull.

The design of the A.B.R.O. experiment required an Ayrshire bull to be used on the F × J. The F × J × A produced was then put back to a Friesian again to breed a F × J × A × F—a rotational cross-breeding policy. Some farmers with Jersians have adopted a criss-crossing policy using first a Friesian bull on the Jersian and then a Jersey bull on this cross. Both these latter schemes are complicated and, as Jersians can be produced so easily by using a Jersey bull on Friesian heifers, the best policy is probably to breed them to beef bulls.

The future

Will dairy cross breeding spread? The advantages of cross breeding in beef cattle, sheep, pigs and poultry are well known. Certainly there will be a lot of Jersians born in milk-recorded herds because of the massive Milk Marketing Board field cross-breeding trial. Maybe a lot more Friesians in commercial non-recorded herds will be mated with a Jersey bull this autumn.

This article has been contributed by **F. John Fullbrook, B.Sc., N.D.D.,** who has been in the N.A.A.S. since 1946 and is now Regional Livestock Husbandry Adviser in the South-Eastern Region.

Royal Dairy Show

The 1966 Royal Dairy Show will be held at Olympia, London, from the 25th to the 28th October. This year, in addition to the extensive sections for cows and heifers, beef from the dairy herd, pigs, poultry and dairy produce, there will be a number of special features. These will include a display of agricultural machinery based on the theme 'Fodder Conservation', and demonstrations on bull beef by the Milk Marketing Board, on mastitis by the National Institute for Research in Dairying, and on pig health by the British Veterinary Association.

The organizers, the Royal Association of British Dairy Farmers, have made special efforts to attract visitors from overseas to the Show and it is hoped that the 1965 record total of 1,300 foreign visitors will be exceeded.

The Show will be open from 9 a.m. to 6.30 p.m. on Tuesday and Wednesday, 25th and 26th October, from 9 a.m. to 9 p.m. on Thursday, 27th October, and from 9 a.m. to 5 p.m. on Friday, 28th October.

The Supreme Champion Dairy Cow will be chosen on the Wednesday and judging for the Bledisloe Trophy, the inter-breed competition which is recognized as the blue riband of the dairy world, will be on the Thursday afternoon.

Common Land

K. W. Evans

OVERHEARD at the Wild Life Exhibition at Alexandra Palace last May: 'Don't have anything to do with that Common Land booklet, Connie, its all about the Census'. Wide of the mark? Not really. This official booklet is about the new Domesday Book of common land which county authorities will soon begin to compile. Thousands of farmers and others will need to apply to these authorities for their interests in commons and greens to be registered. Anyone who thinks his interests may be affected should ask his local authority, parish council clerk or main post office for a copy of the free Common Land booklet.

The purpose of registration

The proposals, which are contained in the Commons Registration Act 1965, are broadly the recommendations for registration made by the Royal Commission on Common Land which reported to Parliament in 1958. The Act is essentially a fact-finding measure designed to put an end to the present uncertainties about much of the estimated 1½ million acres of common land and town and village greens in England and Wales. The Act does not set out to change anything; its object is to record and to establish the land and the various interests in it as they now exist. Who owns the common rights? How many animals are each of the commoners entitled

to turn out on the common? Where does the boundary of the common run? Is the land really common at all? Many commons and greens are bedevilled by these uncertainties. Much of the land could be improved, e.g., by liming, slagging, draining, scrub clearance and better stock management. But how can proposals of this kind be made if the extent of all the legal interests in the land is not known for certain? By putting an end to doubts of this kind, and by enabling those interested to find out the true position quickly and cheaply at any time in the future, the Act will enable much of this land to be used to better advantage.

How registration will work

In January, 1967, the County Councils, the Greater London Council, and County Borough Councils will open registers in which, during the ensuing three years, they will record applications from persons and authorities. The registers will always be open for public inspection free of charge. Applications made in the first half of the registration period will be registered free; during the second half of this period a fee of £5 will normally be payable, unless notice of intention to apply is served on the registration authority during the first half of the period. It will be possible to claim that:

(*a*) land is common, or a town or village green, even although the claimant has no legal interest in the land, or

(*b*) the claimant is the owner of land of this kind, or

(*c*) the claimant is entitled to rights of common over land.

Intending applicants can obtain an application form from their registration authority in December; they should state which type of application they will be making. The registration provisions of the Act do not apply to the New Forest, Epping Forest and the Forest of Dean, or to land which the Minister may, on application, exempt. Applications cannot be made in respect of commons and greens in these areas but the position of the persons concerned will in no way be prejudiced. Except in the exempted areas, commons and greens which are not registered will cease to be commons or greens; and likewise, rights of common not registered under the Act will in general no longer be exercisable and will be lost. It is therefore vital that anyone entitled to rights of common which are registrable under the Act should apply for their registration, even although the rights may not at present be exercised.

All registrations will at first be provisional. Copies of them will be sent by the registration authorities to the local authorities, including parish councils, in whose areas the land lies, where they will remain open for public inspection. At the end of the first half of the three-year registration period, all provisional registrations will be advertised and opportunity given for the making of objections over the following two years. Similarly, at the end of the three years allowed for registration, all provisional registrations made in the second half of that period will be advertised and objections invited during the following two years. The applicant will be informed whenever an objection is made to his provisional registration. Commons Commissioners with legal qualifications will be appointed by the Lord Chancellor to decide disputed claims. It will be possible for the Commissioners to be assisted by technical assessors, for example, where the nature and extent of common rights are governed by local customs peculiar to the district.

If no objection is raised to a provisional registration, it will automatically become final at the end of the period during which it was open to objection. Where there is an objection which is pursued, the decision of the Commons Commissioner will be final.

Common rights

The only rights which can be registered are rights of common. Some examples are: a right to the herbage (a right of common of pasture); a right to take tree loppings or gorse, furze or underwood (a right of estovers); a right to take turf or peat (a right of common of turbary). There are many other kinds of common rights, some of which are purely local in character. It is well nigh impossible to give a comprehensive list of all the various types; one would almost certainly leave out some obscure right of common which exists perhaps only in one particular parish. This is why the Act does not attempt to give a comprehensive definition of the expression 'right of common'. Anyone who is doubtful whether he has such a right should seek advice. A local commoners' association or local farmers' union branch may be able to help. Sometimes it will be necessary to consult a solicitor.

The main object of registration is to put an end to uncertainty. That is why all applicants for the registration of rights of common of grazing will be obliged to state the numbers and classes of stock which they believe they are entitled to turn out on the common. This requirement will apply even when the rights are not at present expressed by actual numbers but are referred to as being '*sans nombre*' or based on 'levancy and couchancy'. In this way registration will remove what can at present be a source of friction and dispute among commoners. What a big step forward it will be when there is a register for every common showing the numbers and classes of stock which each of the commoners is entitled to depasture. Very often the rights of common will be comprised in a tenancy of the farm or holding to which the rights are attached. Either the tenant or the landlord can apply, or they can both do so separately. But a much better plan will be for them to apply jointly on one application form. If they apply separately, and the applications differ, this will lead to each of the registrations being treated as an objection to the other. Also, a party who leaves it to the other to apply will have no right to appear at the hearing of any objection to the provisional registration.

Who owns the common?

Anyone who owns a common or a town or village green will need to claim his ownership under the 1965 Act, unless the land happens already to be registered under the Land Registration Acts. In that case he will not be able to apply for his claim to ownership to be registered under the Commons Registration Act, but his position will be safeguarded. Registration of a claim to the ownership of land will not constitute evidence of title for purposes other than those of the Act. Where nobody claims the ownership of land registered as a common or a green and the land is not registered under the Land Registration Acts, then a Commons Commissioner will try to find out who the owner is. If he fails to do so, and the land is a town or village green, it will be vested in the appropriate local authority; where the unclaimed land is registered as a common, it will be vested in such body or authority as Parliament may decide at a later stage.

Consultation

It is in the interests of everyone concerned with a common, i.e., soil owner and commoners, as well as other people who simply walk over the land, that the possibility of objections being made to registered applications should be reduced to a minimum. All the people who are interested in a common are therefore recommended to meet together before the start of registration in January next and to discuss the nature and extent of the claims which each of them will be making. Where does the boundary of the common run? Is the land common or a village green? How many head of stock and of what kind can each of the commoners turn out? If all those concerned can agree informally upon matters of this kind before applications are made, it will help to speed up the registration process and save everyone trouble and expense. In some areas meetings of the local interests have already been held with a member of the M.A.F.F. Agricultural Land Service present to give general advice on the Act.

THE AUTHOR

K. W. Evans has been connected with land work in the Civil Service for the past seventeen years and is now head of the branch dealing with common land.

Although it is important to find out the facts by registration, this is only the first step. The Government is already pledged to introducing further legislation for commons but this cannot be done until the facts begin to emerge. The second-phase legislation will be particularly concerned with the remaining recommendations of the Royal Commission. These are designed to enable the commons and greens to be put to fuller and more effective use both for agriculture and for amenity and recreation.

A warning

But the first task is registration, and this will be a tremendous job. There are believed to be something like 5,000 commons and greens covering 1½ million acres, or about four per cent of the land surface of England and Wales; and goodness knows how many people enjoy rights of common. Registration can only be a success if all the land which is a common or a green is registered and if everyone who is entitled to exercise common rights (even though the rights may not actually have been used for some years past) applies for his rights to be registered. Remember, if land which is a common or green is not registered, it will no longer be a common or green in future; and registrable common rights which are not claimed will be lost for ever.

Avoiding Potato Damage

C. de B. Codrington

POTATO damage is potentially the greatest cause of loss for potato growers. Not only do the damaged potatoes have to be dressed out before sale, but often the breakdown of damaged potatoes in store causes the spread of disease to otherwise sound tubers, thus increasing the overall loss.

We must accept the fact that the housewife is becoming more quality conscious than ever before in her choice of foodstuffs, and potatoes are no exception. A damaged potato is therefore a wasted potato and represents a loss which no one, especially at the present time, can afford. A recent survey on a large number of farms has shown that one out of every three potatoes grown is so seriously damaged that it falls below the Potato Marketing Board's ware standard.

The identification of damage

The reasons for the occurrence of potato damage are very complex and much scientific work is being carried out at the present time to find the answers. However, one is often left with the feeling that those farmers who have taken real trouble to investigate their own growing, harvesting and handling methods, have done much to resolve the problems on their own farms. The finest machinery in the world is of no use if badly managed, and the more complex the machinery the higher the standard of management required.

At harvest time it is not always possible to see the magnitude of the damage. Because of this many potatoes are put into store in a severely damaged state which could have been avoided had those responsible only been aware of the position. For this reason a few determined growers take random samples of their potatoes at different stages of harvesting and handling and subject them to a simple test procedure designed to show up every tuber injury.

Damage testing

The test involves the use of a chemical called para-cresol which can be obtained commercially in the concentrate form through a large chain of retail chemists. When para-cresol comes into contact with the newly-exposed

flesh of the tuber it turns to a bright red colour after a few minutes. The tubers are then easily divided into four categories:

1. Undamaged.
2. Surface scuffed—sometimes described as 'feathering', especially with new or immature potatoes.
3. Slight peeler damage which can be removed with a peeler.
4. Severe damage—deep cuts and splits.

If the different categories are weighed, the percentage of tubers in each can be quickly determined. Where no accurate weighing scales are available the determination can be made on the basis of a tuber count.

Cause of potato damage

The potato tuber is very susceptible to damage and the economic need to replace hand labour by machines greatly increases the opportunities for causing damage. One day varieties of potatoes showing a high resistance to damage may be bred, but this will take a long time. In the meantime the greatest scope for avoiding damage lies in the fields of cultural practice and the design and correct operation of the machinery used in the harvesting and handling of the crop.

The susceptibility of the tuber to damage greatly declines with increasing maturity. Therefore anything which can be done to gain early maturity such as chitting, judicious use of fertilizers and haulm destruction techniques, should be thoroughly investigated. This, however, is of little help to the potato grower who lifts his crop early in the season while in green top for direct sale off the field.

There is now no doubt that damage prevention measures must be taken early on in the season, in fact before the crop is planted. The design and development of potato harvesting equipment has now reached the stage where it is unlikely that there will be a major breakthrough unless plant breeders produce varieties with radically different growing characteristics. Undoubtedly there will be many new and improved machines coming on to the market, but unless these machines are allowed to work under the best possible conditions their potential performance will not be achieved.

Clods formed during pre-planting and post-planting cultivations constitute the most serious hazard to successful potato harvesting. Hard, dried-out clods not only damage the potatoes as they pass through the machine, but also cause a problem when they have to be separated from the potatoes either mechanically or by hand. In order to relieve the strain on the pickers many harvester operators try to break up the clods by running the machine too fast, thus causing more damage to the potatoes. Even under difficult soil conditions judicial and timely cultivations can do much to reduce the number of clods.

Clod-free cultivations

Every student of agriculture is taught that, according to the rules of good husbandry, the land must be kept in good heart. Yet, in how many high cash cropping areas of the country do the potato fields receive liberal applications of dung, one of the best soil conditioners available? Unfortunately, because of economic factors affecting the general pattern of

farming, very few do so. Therefore one has to accept that some soils are becoming increasingly more difficult to manage. This is an added reason for taking greater care with cultivations.

If ploughing can be carried out in the early autumn the maximum benefit can be obtained from the action of the frost. In the spring, cultivations should be kept to the absolute minimum and carried out only when the soil is in a fit state to be worked. Unfortunately because of the slow rate of work of planting machinery, many farmers feel they have to press on and plant the crop almost irrespective of the soil conditions. Perhaps the provision of high-speed planting equipment is a field in which the agricultural engineer can help in the future.

Because of the size of harvesting equipment and tractor tyres there is now a definite tendency to plant in wider rows. Thirty-inch row spacing is not uncommon and by doing this a great deal of ridge compaction can be avoided. Post-planting cultivations should also be reduced to the minimum. Pre-emergence sprays can help greatly.

Conclusion

Before harvest starts see that all machinery is in perfect working order and all worn parts replaced, especially rubber protective coverings. Most harvesters are fitted with a range of controls for setting the machine, but unless the operators know how and when to use them they are of little use. Ensure that the operators are trained and have read the book of instructions provided by the manufacturer. During harvesting parts of the machine will become worn and should be replaced as soon as possible. In subsequent handling after harvesting further opportunities occur for damage to take place. Testing for damage will help to highlight these points and enable action to be taken before it is too late.

These observations, based on the practical experience of potato growers, may be best summarized as 'Start right—think about damage prevention early'. It is not too late to start thinking now.

Potato Damage on the Farm, a bulletin showing how damage can be reduced, is available free from the Potato Marketing Board, 50 Hans Crescent, Knightsbridge, London, S.W.1.

The author of this article, **C. de B. Codrington, N.D.A., N.D.Agric.E., A.M.I.Agric.E., A.M.A.S.A.E.**, is Machinery Officer for the Potato Marketing Board. During the past few years he has visited many countries in Europe and last autumn went to the U.S.A. to study American potato harvesters. Mr. Codrington was awarded the Johnson Medal in 1956 for outstanding merit in the N.D. Agric. E. examination.

The Creation of Wye Fruit Limited

T. J. M. Bot

THREE years before the hydraulic ram lowered the first two bins of apples into the waterflotation at Ledbury, a handful of brave, forward-looking growers met to discuss the possibility of co-operative grading and packing. Most of these growers had their own packing and storing facilities, but with the general tendency towards amalgamation it was felt that co-operation was the only way to improve the efficiency of packing and to co-ordinate the marketing. Once this was agreed, there was a long road of problems and obstacles ahead. Much investigation had to be done to achieve the agreed goal. A Packhouse Investigation Committee of six growers was formed and this committee did an enormous amount of spade work for two years before Wye Fruit Limited was on the map.

Membership

First came the question, was there enough support from growers who were producing first-class fruit of up-to-date varieties? The Agricultural Central Co-operative Association undertook a survey and established that there was sufficient interest among growers to invite them to a meeting. This meeting was attended by most fruit growers in the district. A number of them, however, were more curious than interested. Here I must emphasize that the grower must have the right attitude and be prepared to discipline himself to meet the requirements of the co-operative; this is a vital factor in the ultimate success or otherwise of co-operation.

Growers joining a co-operative must aim to grow consistently a really first-class product. If they do not they will for ever blame their co-operative for the poor returns when in point of fact they have already lost money before their produce is anywhere near the packhouse. Growers should be in the business to make money, but there are still far too many who look upon growing as a sideline. Most growers in the latter category should not contemplate co-operation. It is better if growers specialize and, once established, produce quantities of fruit which make it worth while collecting. I should make it clear that we do not oppose small growers joining a co-operative. We have growers with only five acres of fruit, but as they are nearly all Coxes with some pollinators, we can still collect economic loads of fruit. Perhaps the most difficult, but in my opinion the most important, qualification of a member in any co-operative is his approach to his membership. If he signs

Part of Wye Fruit's office block and reception area

an agreement and thinks that by doing so he has fulfilled all his obligations to his organization, then he will sooner or later become a disillusioned member and a headache for the co-operative. It is so necessary that there is a great deal of give and a little take both ways.

Full marks must be awarded to Wye Fruit's Packhouse Investigation Committee for managing to create sufficient confidence to get twenty-four growers to sign an agreement which bound them to send their entire crop to the central packhouse for five years. For some growers this must have been a most difficult decision, because they were completely geared to do their own marketing with money invested in packhouse, cold stores and machinery. However, Wye Fruit Limited was now a fact. The legal and other expenses of setting up the co-operative were paid for from Ministry grant, and the Company took over the use of members' stores and also those bin pallets and boxes which were of a standard size.

Finance

A preliminary budget was made after committee members had visited fruit packhouses in other parts of the country. Whilst these were in themselves very interesting, the problems facing Wye Fruit were different in that other packhouses had been formed a number of years ago with a relatively small throughput at a time when grading standards were low. Starting from scratch with the emphasis on bulk handling, we had to build a packhouse and machinery which were in keeping with present requirements and quality standards. It meant, of course, a high initial capital outlay and the big question was, where was the money to come from? It came from three sources.

1. The members were asked to contribute 7*s.* 9*d.* per bushel of their forward estimated crop or past three-year average, whichever was the higher.
2. The Midland Bank lent us pound for pound of capital contribution.
3. There were the Government grants.

The total sum from these three sources amounted to approximately £150,000.

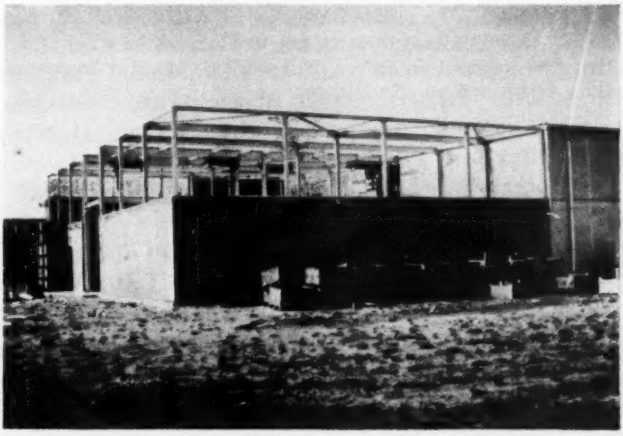
The buildings and machinery

Out of this sum everything had to be provided, from a packhouse to teacups. We employed Food Industries of the U.S.A. as our consultants. These people had built a number of packhouses all over Europe and the United States and they are experts in the field of food handling. Because our packhouse was to be the first one built around one fast grading line capable of a high throughput, there was no 'blueprint' to help us. At the same time we had to be careful that a grading line which was suitable for Golden Delicious, etc., in the U.S.A. or France, would be suitable for Coxes in this country. The building of the packhouse, cold stores and auxiliary buildings was quite an undertaking and things were not finished when promised. Despite this we started the 35 motors of our grading line on 3rd September, 1964. We had begun, but it took nearly the whole season before we approached anywhere near the expected efficiency.

Other preparations

Before the first fruit was transported to the packhouse an enormous amount of preparation was needed. We had to build up a complete system of administration starting with fruit advice notes, which growers use when fruit is sent to the packhouse, right through the procedure of storing, grading, dispatching, and pooling to the final pool payout sheets.

Members were asked to do things they had never done before. For instance, in order to plan the throughput, we needed fairly accurate crop estimates. Before growers had joined the Company their entire crop was picked and dealt with in their own packhouses. Now the story was to be different. It was vital for members to understand that any fruit sent to the packhouse which had to be eliminated because of the size or quality not only fetched little or no money, but also, because of the cost at the packhouse, produced a substantial loss on each bushel. The result was that better fruit carried the cost of poor quality and this could lead to disappointing overall returns. It was up to us to make growers fully aware of this problem. Although our members were very co-operative and raised their picking standards, it was not until returns came home that some of them realized that it is only economical to send really good quality fruit to a central packhouse. The



Since 1964 the storage capacity at the packhouse has been trebled. These stores were built largely with the co-operative's own labour, using insulated panels manufactured in the packhouse

same thing applies to packhouses on farms, but it is a most unfortunate fact that costs of handling, storing and eliminating bad fruit are often obscured for a variety of reasons, with the result that it is not until growers join a central packhouse that they discover how expensive it is to produce bad quality fruit.

One of the big problems in starting a new co-operative is finding the right staff. The work most of them have to do just cannot be explained. Hardly any of the girls we employed had a basic knowledge of fruit grading and it was very much a question of trial and error. An essential job was to find a good team of people to take key positions in the packhouse and office. Success depends so much on team spirit, and soon after we started packing we arranged regular staff meetings to discuss problems which were often solved together before the week was out.

Marketing

It was obvious that we were going to have our hands full trying to get things going in the packhouse. To do our own marketing right from the start was going to be a very difficult task. It was a happy coincidence that, when we started, Home Grown Fruits Ltd. were firmly established as the biggest marketing organization of home-grown apples and pears. We decided to join H.G.F. and in doing so we committed ourselves to grading and packing to the highest standards. Fortunately H.G.F. posted one of their inspectors with us for two months and this was a tremendous help. Nevertheless, we found it very hard and costly to comply with their standard in the first year.

Conclusion

Our experience shows that the formation of a new co-operative is not an easy task. It needs a lot of courage, discipline, tolerance and capital. I believe, however, that provided the management and Board of a co-operative have the confidence of its members who therefore feel that their produce is treated with care and that the prices obtained are competitive, then co-operation, which in this country is still in its infancy, will continue to grow.

This is the second article in the series on co-operation in agriculture.

T. J. M. Bot, who is General Manager of Wye Fruit Ltd., comes from a Dutch farming family. After horticulture schooling in Holland, he emigrated to this country in 1957, started as a grower in Surrey, and worked for other co-operatives for six years before taking up his present appointment.

Pig Production in the Common Market

R. C. Rickard

In 1964, the thirty-seven-and-a-half million pigs in the E.E.C. accounted for roughly fourteen per cent of its total agricultural production. They are second only to dairy products, which contributed about nineteen per cent of total agricultural production. For the entire E.E.C., pigmeat in all its forms represents about one-half of total meat consumption. However, consumption per head of population varies considerably from one country to another. In the hotter climate of Italy it is roughly fifteen pounds per year. In Germany, on the other hand, it is seventy pounds, mainly in the form of processed meat of one kind or another.

Generally speaking, the E.E.C. is self-sufficient in pigmeat but the situation differs from country to country. For instance, Germany and Italy are net importers, producing about ninety-five per cent of their total requirements. On the other hand, the Netherlands has a substantial surplus for export, producing one-and-a-half times its domestic needs; France and Belgium, while increasing their exports, also import certain kinds of pigmeat. Traditionally, the areas of surpluses and deficits have not been complementary within the E.E.C. In the past, Germany has tended to import from Denmark and Poland, and Italy from Eastern Europe. The Netherlands has had its main export markets in the United Kingdom and the U.S.A.

A regulated market

Community regulations affecting live pigs (other than breeding animals) and whole and half pig carcasses came into effect in July, 1962. Those for pork cuts and all the other products containing pigmeat were introduced

in September, 1963. The principles underlying the regulations are the same as the fundamental tenets on which the common agricultural policy of the Community is based. They are: the common organization of markets; the diminution of price fluctuations; the balancing of supply and demand and the yielding of adequate returns to producers.

The regulations are undeniably complicated and the reasons are not far to seek. In the first place, pigmeat is a 'processed' product, with feedingstuffs as its raw material. Thus feed prices have to be considered in determining the level of protection being given to pigs. Secondly, for many years member states have protected the pig industry in a variety of ways, by customs duties, quotas, minimum prices and other restrictions on trade. As a result trade was limited and appreciable producer price differences arose between one country and another. However, such complexities in trade within the Community are being progressively resolved. It is envisaged that, with the harmonization of cereal prices as from July, 1967, all obstacles to trade within the Community will have been removed and imports from outside the Community will be subject to a system of common levies and an import duty.

Thirdly, pigmeat is by no means a single commodity. Thus there is a whole series of regulations applicable to various types of live pigs, carcasses, pigmeat cuts and products. However, each one is directly or indirectly linked to that concerning pig carcasses or sides, the basic product. Three main devices are used to regulate trade in pigs and pigmeat. They are: variable import levies; minimum import or 'sluice gate' prices; and restitution payments, or export refunds.

The levy system

There are at present two kinds of levies. Until July, 1967, the transitional period, there are levies on imports from member states, and the permanent levies on supplies from third countries outside the Community. The intra-Community levies take account of two factors. The first is an assessment of the effect on pig-feeding costs of differences in grain prices in the importing and exporting countries. The second is designed to compensate for differences in the wholesale prices for pigmeat in the various member states. Both elements, and consequently the intra-Community levies, will disappear in July, 1967.

For each member state, the levy on imports from third countries consists of three parts. First, there is the levy which the importing member state applies on imports from the member with the lowest price for pig carcasses, that is, the Netherlands. The second is the effect on pig-feeding costs of differences between the prices of feed grains on the world market and in the Netherlands. Thirdly, there is an *ad valorem* duty, increasing annually to seven per cent for some products and ten per cent for others by 1967. When the common market stage is reached, the first, or intra-Community element will have disappeared and levies on imports from third countries will consist of the feed cost element, based on world and Community grain prices, and the fixed *ad valorem* duty.

Minimum import prices

The levy system is safeguarded by minimum import, or sluice gate, prices which are fixed for member and non-member states. They are minimum

offer prices designed to prevent under-cutting of the internal price level by offers at abnormally low prices. If the offer price falls below the minimum import price, the Commission may fix a supplementary amount to be added to the usual levy and this is calculated from the difference between the offer price and the higher minimum import price. For imports from third countries, the minimum import price is an estimated cost of producing pigmeat outside the Community. Its calculation involves a representative fattening conversion rate, average world feed grain costs and other factors including prices of concentrated protein, pig rearing and marketing costs. The intra-Community levy, less the *ad valorem* duty, added to the third country minimum import price gives the intra-Community minimum import price, but here again this is only a temporary measure due to end in July, 1967. The way in which the system works may be seen from a recent example, relating to live pigs, given at the end of this article.

Export refunds

The regulations make provision for the payment of restitutions, or export refunds. In justification of the practice, it is argued that the granting of export refunds is not specifically designed to encourage exports but merely to make them possible. They are only a counterpart, on the export side, of import levies and are limited in total to the receipts from levies applied to the imports of a particular commodity. On exports to non-member states, the rate of payment is equal to the incidence on pig-feeding costs of the difference between the prices of feed grains in the member state and on the world market. However, additional amounts have in the past been permitted, taking into account the world price for pigmeat compared with the Community. It is likely that this factor will in future determine the rate of restitution payment which will be allowed. Restitution payments on trade within the Community are a temporary arrangement. When cereal prices are brought into line, internal restitution payments will disappear.

The future

The fact that the E.E.C. regulations have been laid down in great detail should not create the impression that they are not capable of being adjusted to meet changing conditions. They have already been subjected to many amendments. Levies on certain products have been changed to comply with agreements arrived at in the G.A.T.T. and more are likely to follow. It should also be recognized that many difficult problems remain. There is the problem of veterinary and animal health legislation. For many years the position has varied widely from country to country and there is little doubt that the veterinary provisions have in the past been manipulated for commercial purposes. The Commission adopted directives in June, 1964, giving member states a year in which to align their national laws with the requirements laid down. Additional proposals with regard to third countries have since been published but it is questionable whether complete harmonization will be achieved by July, 1967.

Of more direct relevance to pigs and pigmeat is the introduction of common standards of carcass grading. At present price quotations are not on a common basis throughout the Community, yet it would seem imperative that a uniform system be in operation before July, 1967. The Commission has been devoting considerable attention to the establishment of a common

system of carcass grading. It has been proposed that the classification should for the present apply to pigs and carcasses only, and should be made on the basis of type of pig, weight and thickness of fat. The suggested system comprises in all thirty-six categories, although it must be admitted that only about half of them will have any commercial importance. Of greater significance, perhaps, is the fact that, with the exception of Germany, member states will not find the change an easy one to make.

Finally, experience to date has shown that since the introduction of the regulations pig production cycles in the various member states, and in other countries too, have tended to coincide with one another. The possibility of being able to balance a surplus in one country against a deficit in another has not materialized. Thus the levy system alone will not be sufficient to curb the fluctuations in domestic pig prices, particularly the drop in prices at peaks in pig production. In the past, support buying in one form or another has played a prominent part in market regulation among the E.E.C. countries. In recognizing that market intervention is likely to be needed in the future, the Commission has laid down certain guiding principles. The measures taken, in addition to their immediate effect on prices, should exert a positive stabilizing influence on pig numbers. Their timing and duration must be harmonized throughout the Community. And, to add a touch of realism, only such measures which justify the expense should be taken.

	Netherlands from third countries	Germany from Netherlands	Germany from third countries
		(per score live weight)	
Import levies	*s. d.*	*s. d.*	*s. d.*
Feed cost difference	2 6	4 7 [1]	7 1
Ad valorem duty [2]	7	—	7
Difference in average [1] prices *less* feed cost difference (11*s.* 1*d.*—4*s.* 7*d.*)	—	6 6	6 6
Total	3 1	11 1	14 2

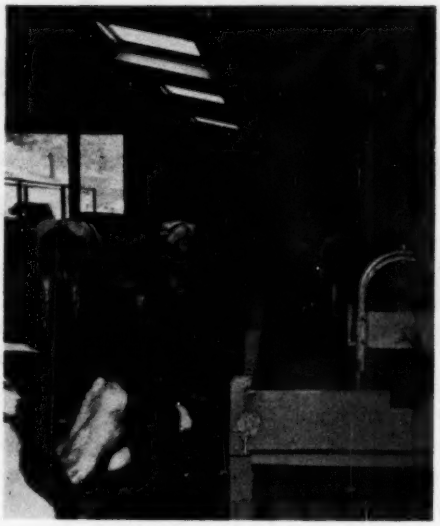
	Netherlands	Germany
Minimum import prices	*s. d.*	*s. d.*
(*a*) From third countries [3]	27 1	27 1
(*b*) From member states [4]		
Third countries	27 1	27 1
Feed cost difference— Netherlands/third countries	2 6	2 6
Germany/Netherlands levy	—	11 1
Total	29 7	40 8

Notes: 1. Disappearing by July, 1967. 2. Rising to 7% by July, 1967.
3. Excludes levies. 4. Includes levies.

The author of this article, **R. C. Rickard, B.Sc. (Econ.)**, is a lecturer in the Department of Agricultural Economics, Exeter University. He has recently completed a study of pig production in various European countries for the Pig Industry Development Authority.

Farm Buildings Feature

containing two articles by members of the Ministry's Agricultural Land Service



Cattle Yards

W. Magson
M.B.E., A.R.I.B.A., A.M.I.Ag.E.

Planning New Buildings

L. M. Parsons
B.Sc., F.L.A.S., A.M.Inst.W.S.

Cattle Yards

W. Magson

ERRORS in the planning and construction of a building can usually be rectified by alteration or adaptation, and as equipment becomes out of date it can be changed. But mistakes in siting are much more permanent, so it is important to make sure that the site for the new cattle yard is the correct one and that it is being used to the best advantage. The position of a cattle yard is usually fixed by the proximity of roads and buildings such as fodder stores, the meal house or the dairy buildings. Services must also be considered but water and electrical mains are not expensive to extend, within limits, and the position of these need not be the deciding factor. The same cannot be said about drainage, particularly with dairy buildings, where the system of manure disposal could very well dictate the layout of the yard and the siting.

The prevailing wind and rain does not always come from the same direction in all parts of the country, but as a general rule, a covered yard with yards on either side of a central feeding passage has a better chance of enjoying an even environment in each yard if the ridge runs north to south. Partly-open yards have much to commend them in certain areas, but the disposal of the effluent from the open portion is sometimes a problem and on most farms fully-covered yards are to be preferred. In yards of this type the open side should face into the south-east, as in the winter there is usually more and better sunshine from this quarter. All cover for cattle should have at least two adjoining sides closed in; otherwise there is a risk of a yard becoming a draught tunnel. The presence of an adjacent building does not ensure that the yard will be sheltered unless this building is very close; a cold wind will whip over quite a high building and make conditions in the yard unpleasant.

The right environment

Beef and dairy cattle will thrive in the range of temperatures prevalent in this country. Variations of temperature up to 80° F and humidities of 75 per cent are acceptable in cattle yards and do not appear seriously to affect the performance of adult cattle, always provided that the changes are not sudden and the lower temperatures are not accompanied by damp or draught. To achieve satisfactory ventilation the roof of the yard should preferably have some degree of heat insulation. Spraying the underside with some insulating material is one way; 'sandwich' construction is a better job if the cost is justified. Ventilation must be arranged to permit an even movement of air above the head of the stock. So long as the ventilating openings keep

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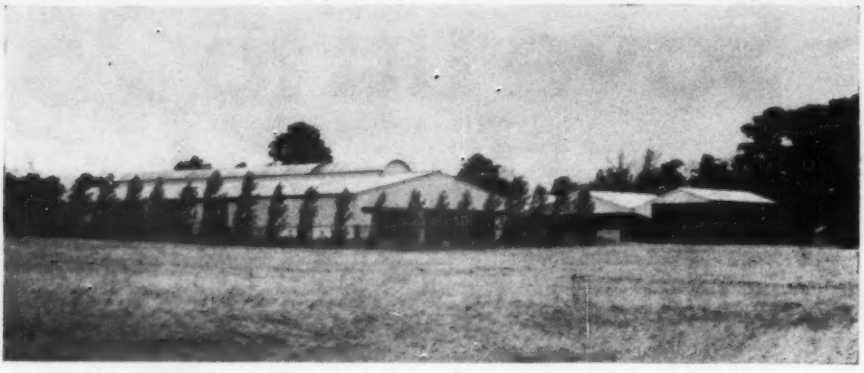


These cattle yards and fodder storage buildings at Drayton E.H.F. are proof that a large area of buildings with different spans need not look unsightly

out the wind, rain and snow, the total area can be quite extensive. Fans are occasionally installed to overcome the uncertainties of natural ventilation, but in most yards a natural system is quite practicable for the normal stocking densities, unless there are difficulties arising from the site or locality. Space boarding, i.e., boarding with open gaps of ½ in.–1 in. between the boards, which is an old idea, has been reintroduced as wall cladding and has done much to bring about satisfactory natural ventilation in cattle yards; the gaps also admit a beneficial pattern of sunlight.

Space requirements

It is difficult to generalize about the space requirement for stock as so much depends on the age and breed, size of groups, type of yarding, layout and management. As a guide, dairy cows in bedded yards need 40 sq. ft of bedded area with 20 sq. ft of feed and exercise space. Adult cattle on slats require an equivalent area of 35 sq. ft, and cows in cubicles 45 sq. ft, which includes a proportion of the access passage. Beef cattle do not necessarily have to be kept as clean as dairy cows and need less exercise space; a workable area for beef cattle bedded in a fattening yard is 40 sq. ft. All figures quoted are square feet per head of stock and are not intended as minimum figures.

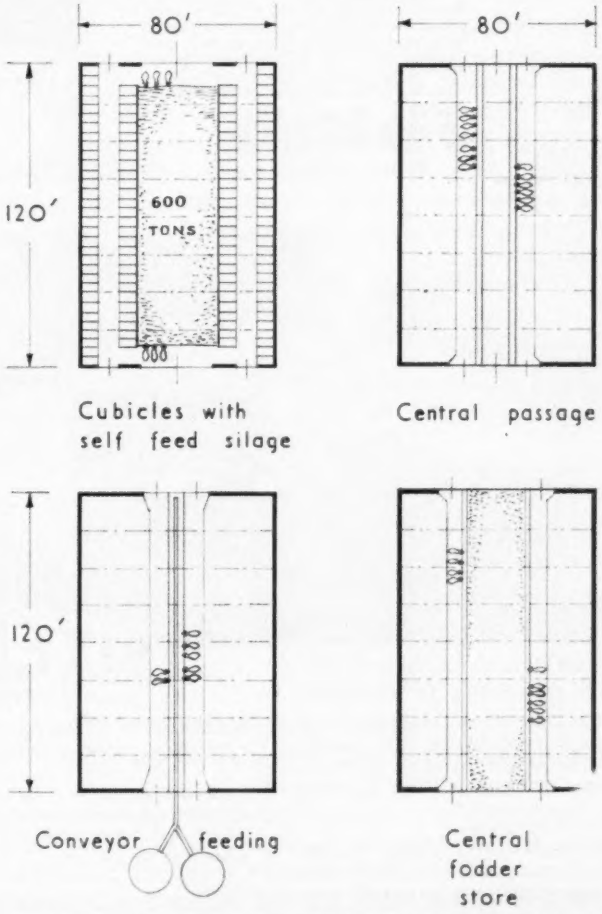
Planning

When planning a straw-bedded yard for cows, it is worth while making the building of a span which would be suitable for cow cubicles, to allow for possible changes in management. The most economical arrangements in this case are those where each two rows of cubicles share the access passage. A bedded area that is square, or nearly square, is more economical on litter than an oblong one, and for the same reason a wide access from the feeding area to the strawyard is advisable. Where the cattle are housed for five months in the year and cleaning out is done once a year, an ample allowance for the build-up of muck is necessary. The minimum is four feet, with sufficient height allowance above for cleaning out: 10 ft–12 ft high to eaves is satisfactory—8 ft with cubicles. The build-up of muck at the manger face in a fully-strawed yard is always a problem. Raised feeding passages are better than excavated yards and there are a number of different types of adjustable mangers which work. The problem is eased if the approach to the manger is sloped about 1 in 5, as the stock tend to tread the straw back from the

slope, reducing the build-up at the manger face. Steps up to the manger are preferred by some, because it is easier to operate a loader against a square edge.

In recent years slatted floors have been extensively used in livestock buildings. The advantage of slats with a dung holding area below, is that the daily dung handling is eliminated and the work routine eased, which is particularly helpful in the busier winter period on livestock farms. Slatted floors should not be used where the cows are intended to lie, but for the feeding and movement areas, for example, passages between cubicles. The individual slats are made of suitably reinforced concrete, hardwood and steel in the form of rolled sections. Steel grid floor sections are also available. Spaces between slats depend on the age of cattle, but for adult stock $1\frac{1}{4}$ in. to $1\frac{3}{4}$ in. with 5 in. wide slats is now generally accepted. Whatever material is used, the slats must be made with precision and laid on strong supporting walls.

Feeding cattle in a yard is a daily job. It forms the major part of the work requirement and, with the fodder storage, method of feeding determines the planning much more than any other aspect. Whatever feeding method is adopted, the layout of the yard should be flexible enough to allow for a



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change. Alternative methods are self-feed, conveyor feeding to bunker, or various systems of carting fodder to the feeding face. Adequate manger length for the numbers, age and type of stock to be fed is most important and has to be planned in relation to the bedded space. Mangers are best built in straight lengths with room for access and movement for the men and machines replenishing them. Some holding space for fodder in the feeding passage for easy feeding at week-ends and other times is always worth while. Workable dimensions for trough lengths with restricted feeding are 20 in. per head for yearlings and up to 24 in. per head for 10 cwt cattle. Three-month-old cattle will feed over the lip of a trough 27 in. high if they are standing on the level and the trough is not too deep.

Construction

The rigid portal-type arch frame with members of concrete, steel or timber, or a combination of these materials, has so far supplied most of the answers for cattle yard construction. Frames of this type are available in a variety of single or multiple spans and most farm requirements can be met at competitive cost. Recent developments have been made in the prefabrication of the complete components for a cattle yard that can be handled and erected without specialist equipment or knowledge. One type of building is made up of light steel rectangular hollow sections used as the frame members, with prefabricated wall panels made of tempered hardboard on a timber frame, rather like flush doors. This material and plywood are suitable for the walls of cattle yards and the panels are fitted so that they can be moved or taken out for access into any part of the yard. Prefabricated panel construction in place of walling is an interesting development, and no doubt there will be more in this direction. Cow kennels, which are cubicles with the vertical members extended to carry the roof. are an example of the trend towards the lighter form of construction. The use of telegraph poles and other suitable timbers for simple post-and-lintel construction is another.

One of the main objects of a building is to keep out the weather, and this is often defeated by the inadequacy of the construction. Badly-fitting components, inadequate rainwater fittings, and slopes on yards and roads which run the wrong way, are all too common. If valley gutters are unavoidable, they should be made wide enough for proper maintenance. All construction in the yard has to be robust. Covers for gullies and inspection chambers should be made out of sawn sleepers, steel plate or grids of steel tube, not cast iron. Water bowls need to be well sited and protected if they are to survive; flaunching to the rim in concrete is one way of protecting them. Water services are out of the way of damage and frost if threaded through drain pipes laid below the yard floor, and the cost of doing this is not high. Concrete and well-consolidated hardcore are suitable for surfacing a yard. A damp-proof membrane below the concrete floor of a building used for grain storage as a guard against rising moisture is essential, but it could be a disadvantage in a cattle yard as the concrete is continually 'ponded' with wet from above.

Cattle yards are usually large buildings and make their marks on the rural landscape. They need not necessarily be unsightly as can be seen by the number of attractive examples there are around the countryside. Proper attention to detail can make the difference between a good and a bad cattle yard from the viewpoints of both efficiency, maintenance and appearance.

Planning New Buildings

L. M. Parsons

ANOTHER article has described modern developments which should provide scope for enormous increases in productivity so far as housing cattle is concerned. These opportunities are essentially long-term in character; they may also occasion a substantial amount of capital investment. But buildings are inanimate creations and much depends in the end on what goes on inside them. There are also many chances of short-term improvements which need not cost very much but which do require thought and some ingenuity. New buildings are designed to help in the planning of work and to make the best use of expensive manpower. But they cannot increase the effectiveness of workers on their own. This requires a good deal of effort on the part of management and worker alike, management meaning the organization and control of human activity directed to specific ends. We deal with human beings on the farm every day, and highly-skilled ones at that. We also deal with livestock, and many of them are highly bred, specialized creatures with their own peculiarities and faults.

Men and animals

It has been found time and again that apparently bad layouts of buildings for livestock are, superficially at least, as efficient as apparently good ones. This first impression lasts only until one gets down to brass tacks and actually goes into the organization and routines in detail. Then some of the reasons for this apparent anomaly are quickly revealed. One of the main reasons seems to be a lack of understanding or communication between master and man and the livestock concerned. Another is an obvious failure to think about the jobs done in and around the buildings. And yet another reason has turned out to be an incomplete knowledge of just how new buildings of advanced design affect the animals they are designed to house.

In farming, all these problems are, in the main, products of modern times. But, as Robert Owen wisely said in an address to fellow northern industrialists as long ago as 1850: 'You have all experienced the manifold advantages that scrupulous care of well-contrived and well-executed substantial machinery can bring. What may not be expected if you devote equal attention to your vital machines which are far more wonderfully contrived.' Yet examples continually arise in farming which go a long way to support the truth of Owen's remarks. How often has a new parlour and loose-housing or cubicle layout been carefully planned, built with every attention to detail,

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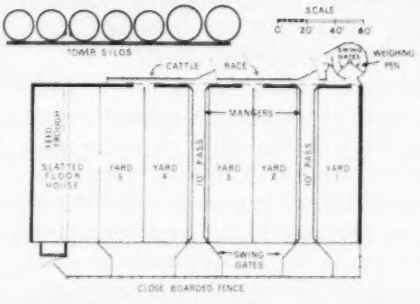

Because modernization to this farmer meant more than just a set of new buildings he chose Crendon. Crendon planned modernization is providing greater efficiency in operation of this intensive beef unit, plus a far more economic use of labour. Multi-span covered cattle yards accommodate 600 Friesian Hereford cross animals fed from seven concrete Tower Silos. Once again the use of standard Crendon spans ensured early erection and enabled capital cost to be kept to the minimum. Note the use of open ridges and timbered walls and gables ensuring maximum protection with adequate ventilation.

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and then filled with dairy cows and the cowman and the cows virtually left to get on with the job? Or new beef yards built, complete with mechanized feeding, the stock packed in the yards, and the stockman metaphorically thrown in at the deep end? This is one way of getting the job done but very hard on stock and man, and we cannot be sure that the working routines and use of the building are the best that could be devised.

This adaptability, inventiveness, ingenuity and thoroughness with his job make the farm worker second to none. But one suspects that these attributes sometimes go a long way to make new layouts as good as they are. Of course, the informal mental weighing-up of such situations and problems is part and parcel of every successful farmer's daily managerial work. But it is becoming more and more obvious that a much more deliberate and painstaking—and let us admit, painful—process is going to be necessary if we are going to get the last ounce of increased productivity and thence profits from our new buildings.

The difficulty is that so much of the information and data which is needed is just not readily available for broad application and the making of on-the-farm decisions. This is not because there are so many variable or local factors which we cannot allow for. In fact, generally speaking, these do not affect very much the work routines in any particular building or set of buildings. It is very largely because human beings and living creatures are inextricably mixed up with the new designs and the new methods required to utilize them.

Animals and environment

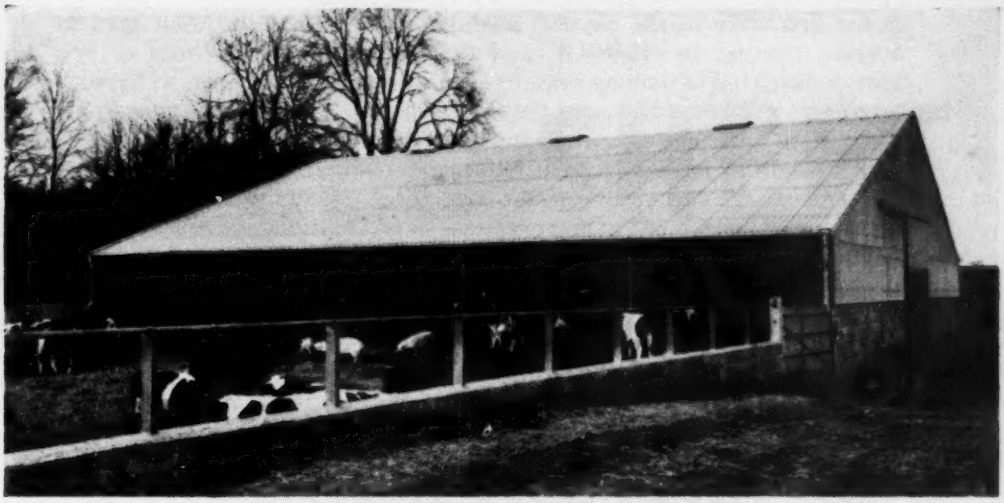
All cattle and all men are separate individuals, and animals particularly are influenced by their surroundings to a greater extent than has hitherto been suspected. Larger and larger livestock units mean more noticeable effects on the cattle kept in them, and only recently has it been possible to try to discover what these effects are.

We rightly spend a good deal of time and money considering what is best for our livestock, and it is obviously sensible to do the same for our men; after all they are going to spend a good deal of time inside that very building. We all reckon to know the widely differing effects that new buildings have on our men; what, therefore, must be the effects on our livestock?

Some of these effects are gradually becoming known and will inevitably assume more and more importance in the future. For example, it has recently been shown by various studies of large dairy herds, both at home and overseas, that milking cows will spend up to 30 per cent more of their time lying down or resting in cubicles than they will in more conventional straw-yards. At the same time they will spend, on average, 10 per cent more time feeding and ruminating than their counterparts in a loose-housing yard. From the point of view of milk production alone this must be advantageous, and certainly for the man in charge it must be considerably less worrying.

Dummy runs

On the other hand, it is no good lightening the task of pure stockmanship if, as a result, a man has to spend more time handling slurry. Only too frequently has it been observed that, far from decreasing this task, the installation of large cubicle layouts has actually increased the time spent on this distasteful job. This is only because insufficient thought was given



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in the first place to the physical methods and routines and tools used in actually running an otherwise carefully-planned layout. An hour or two spent beforehand in dummy runs, or even with pencil and paper, will always save hours and hours of wasted time when the jobs actually have to be done. This sort of job is one case where it pays to buy proper tools and equipment, even though no immediate cash return is forthcoming. Or again, dummy runs through the new outfit with the cows always repay the time and trouble spent. We all know how lost and uncertain we feel in strange or new situations for the first time; how much more lost and uncertain cattle must feel. The smells of paint, new concrete, new equipment of strange shapes, unfamiliar surfaces and doors and passages and strange new surroundings have a very considerable effect on them. This is where stockmanship comes in, and after all, this is what skilled men are paid for.

These dummy runs will also very quickly spotlight any deficiencies in planning or use so that an opportunity is given to put them right before the whole outfit actually goes into production. For instance, just think how careful we all are when we get a new car or a new piece of machinery for the farm. How lovingly we run it in and carefully nurture its appearance. We study the handbook and learn all we can about the capabilities and performance of our new acquisition. We are meticulous with the scheduled maintenance, and woe betide anyone who misses a vital grease point. We watch it so carefully and listen for the slightest indication of imperfection. We should take considerably more trouble with a new set of buildings and a herd of cows; they cost very much more money. They do not depreciate quite so fast, it is true, but they do give us most of our living. If gates do not open or close too well, or doors stick, or there are one or two awkward corners to clean, or there are suspect patches in the concrete, or cow circulation is not quite what it should be, we ought to be as quick to do something about it as we are to tighten a loose nut on a machine.

Conclusion

Cows, like most men, are creatures of habit, and if we can get the right habits going from the day we begin to use a set of new buildings then we shall save a lot of trouble later on. If bad habits seem to persist, then we should ask ourselves why and examine our management and the buildings very closely.

All these things sound so simple that they could not possibly be true. But years of experience in studying routines in cattle housing have shown very clearly that it is the little things like this which run away with money and time and therefore reduce possible profits. We normally expect to have some teething troubles with new equipment and machinery, but when it comes to buildings these drawbacks seem to be accepted without undue annoyance. Yet we have all heard about the legendary reorganization that takes place on Monday morning when the boss has had to do the milking on Sunday.

A well-known American visitor said recently that enough energy was wasted on American dairy farms to send quite a few satellites into orbit. He may well be right. From experience gained on only a fractionally small sample of livestock units in this country, the time and money which could be saved by critical thinking about work routines would have allowed the farmers concerned and their wives to have a well-earned holiday in the West End and dinner every night in an expensive restaurant to boot.

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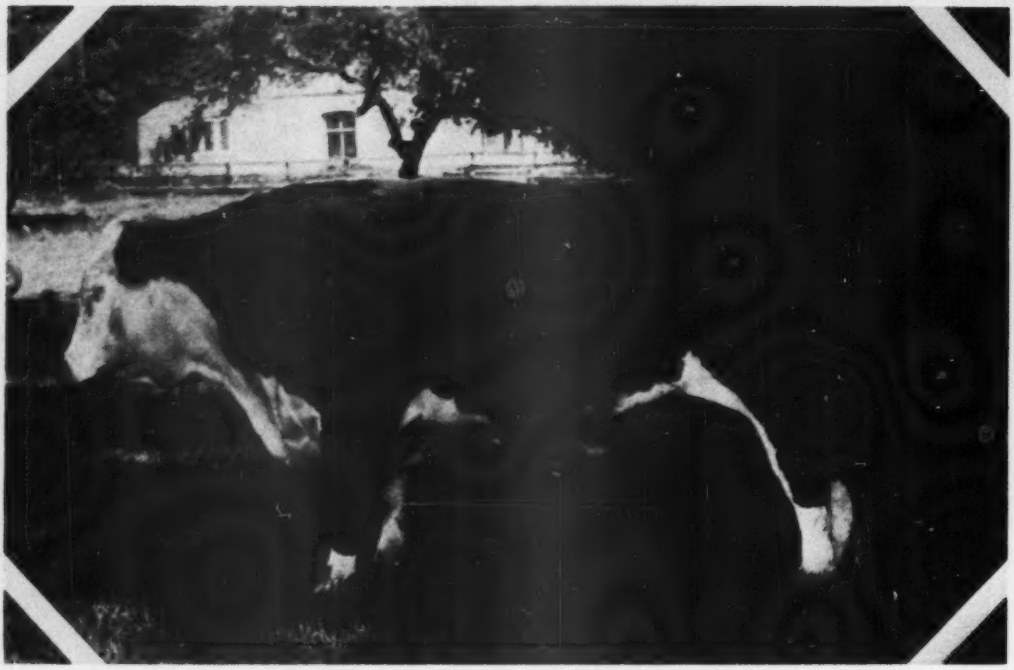

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Barley Straw and Concentrates for Dairy Cows

J. R. Hopkins

WITH the rise in the value of agricultural land in recent years, many farmers have been forced to exploit any method which allows them to increase their financial return. Improved methods of husbandry and management have played, and continue to play, their full part, but as the size of the holding becomes limiting, attention often has to be given to other ways of increasing the effective acreage of the farm. For many years some dairy farmers have done this by using the principle of 'purchased acres'. This is a method which can be very effective. It involves the judicious purchase of concentrates for part or the whole of the production ration and the purchase of foods such as wet brewers grains, beet pulp and potatoes to supplement the home-grown bulky foods. Recently the introduction of a system of feeding based on barley straw and suitable concentrate supplements has taken this principle a stage further allowing, at least in theory, an even higher proportion of the dairy herd to be fed from 'purchased acres'.

The need to supplement

The low inherent digestibility of barley straw limits both its nutritional potential and intake. This low digestibility is partly caused by deficiencies of protein and minerals. For these reasons barley straw on its own is unable to provide an adequate maintenance ration, and if it is to replace good hay for this purpose, it must be supplemented with sources of energy, protein, minerals and also possibly vitamins. Nevertheless, if the daily straw consumption can be maintained in excess of 8–10 lb per head, a level which is essential to sustain both milk and butterfat production, it can be used to provide for part of the maintenance requirements. To sustain high milk production from the cows using barley straw in this way, it is essential that the remainder of the ration should be made up of feeds high in digestibility and adequately fortified with both protein and minerals. This second part of the maintenance ration is normally provided by 6–8 lb of a concentrate mixture containing about 13 per cent of protein. Since straw digestibility can be impaired by a lack of readily available ammonia in the rumen, it is advantageous to use a proportion of a 'soluble' protein supplement such as decorticated groundnut cake, or even urea, in the concentrate mixture.

Examples of suitable mixtures which would meet these requirements are:

	Mixture A	*Mixture B*
Coarsely-ground cereals	18½ cwt	17 cwt
Dec. cotton seed cake	1 cwt	1½ cwt
Dec. groundnut cake	—	1 cwt
Urea	20 lb	—
Limestone flour	20 lb	20 lb
Dicalcium phosphate	30 lb	20 lb
Salt	10 lb	10 lb

In addition, balanced concentrates containing a minimum of 17 per cent protein will need to be fed for all milk produced.

One of the main advantages claimed for the supplemental barley straw system is that all foods used are of fairly standard composition. This prevents the fluctuations in milk production which sometimes arise on the more traditional feeding systems by the over-evaluation of both the feeding value and intake of the bulky feeds. In addition, the risk of dietary mineral deficiencies or imbalance leading to metabolic disorders or reduced fertility potential of the herd is again reduced.

The hazards of the system

The difficulties of this system are probably mainly managerial. They involve feeding the correct level of concentrates to each individual cow according to its level of production and ensuring that all cows consume a minimum of 8–10 lb of straw. Since the dietary concentrates will be providing over 75 per cent of the cow's nutrient requirements, their correct allocation is particularly important if milk yields are to be maintained and milk costs are to remain competitive. Where the concentrates can be fed to the individual cows in shippons or yolked stalls in yards, their allocation can be accurately controlled. However, the use of free-for-all access to concentrates from mangers or cribs in yards frequently leads to over-consumption by the low yielders, which then grow fat, and under-feeding of the high yielders, to the detriment of their milk yield, milk quality and body condition. Another hazard from this system can arise with Channel Island cattle when the milk is sold for liquid consumption. Due to a lack of natural carotenoid pigments in this type of diet, the resulting milk tends to lose its rich yellow colour. This makes it less attractive to the housewife and results in a definite sales resistance, a situation which can prove particularly serious to the producer-retailer.

Its scope

In areas where it is the normal practice to purchase hay or other bulky food for winter feeding, the supplemented barley straw system provides a direct alternative which may prove to be more economic. For example, if good-quality feeding straw can be obtained for £5 per ton and the supplementary concentrate for £26 per ton, then the cost of a medium-to-good hay would need to be less than £11 per ton for it to be competitive, and even less if its quality was only average to poor. The system also has attractions in the drier arable areas of the country where grass is limited but where the supplies of both barley straw and grain are relatively abundant.

The scope for this system is more limited in the wetter western areas of the country, on farms where intensive grassland management is practised to good effect. In most of these areas ensilage forms an integral part of milk production from grass. Even where high stocking rates are experienced, it is very necessary to remove a substantial quantity of surplus grass during the period of rapid growth in May and June for ensilage, so that grass of the right quality will be available during the rest of the summer. In addition, as the grazed areas become fouled by cattle, a silage cut is necessary to restore the grazing potential of the area. By these means, which are essential to facilitate the efficient utilization of the grass by the grazing animal, possibly at least a third of the grass growth would be expected to be made available for ensilage. Since the losses involved in grazing are frequently similar to those for conservation, the quantity of silage dry matter available for winter feed could be expected to be about half the daily consumption of grass dry matter during the summer. This would thus provide a substantial quantity of high-quality bulky food for winter use, which, when supplemented with mineralized cereals or low-protein concentrates, would be eminently suitable for both maintenance and production requirements of the dairy cow.

Conclusion

The supplemented barley straw system can be used successfully for feeding milking cows. It has, however, a relatively high requirement of expensive concentrates and hence, for it to remain competitive with other more traditional methods of feeding, these must be accurately rationed according to the productivity of each individual cow. Where this is done, the system should prove attractive to dairy farmers in the drier arable areas and in the marginal hill areas where it is traditional to purchase hay for winter feeding. In the wetter western areas, however, where grass is easy to grow and where intensive methods of grassland management have been established, its application may be limited until the potential of the grassland has been fully exploited.

After taking his degree at the University College of Wales, Aberystwyth, the author of this article, **J. R. Hopkins, B.Sc. (Hons.)**, joined the National Agricultural Advisory Service in 1957, since when he has been a Nutrition Chemist in the West Midland Region, stationed at Wolverhampton.

Apple Production in British Columbia

F. A. Roach

(2)

Orchard management

SINCE the average rainfall in the Okanagan valley is 10–12 inches, none of which falls in the summer-time, constant irrigation is essential. Normally this is started in early May and continues until mid-September. The frequency and amount of irrigation given depends on the soil type. On light sands water may be applied every seven days and in extreme cases up to 72 inches are applied during the growing season. On more retentive soils irrigation may only be needed at 2–4 week intervals, applying about 3 inches at a time. Although the furrow method of application was used in the past, now up to 75 per cent of orchards are irrigated with sprinklers.

A sward of Poa pratensis, blue grass, may be sown or grass and weeds allowed to develop in orchards after the trees are about four years old. The grass may be cut only two or three times in the season, or about once a month. As a result of the naturally high reserves of potash and phosphates, applications of these fertilizers are not needed and nitrogen only is given. This may be in the form of ammonium nitrate, sulphate of ammonia or urea, and dressings equivalent to 4–5 cwt per acre of sulphate of ammonia are commonly given, or enough to ensure 10 inches of new growth. Nitrogen is usually applied in the autumn after all growth has ceased, though some growers make applications in spring.

Pest and disease control

As a result of the very low humidity apple scab is not usually a problem and can normally be controlled by 2–3 sprays except in the northern areas

where 3–5 sprays may be needed. Apple mildew can be troublesome but following severe winters such as 1964–65 the disease is killed out of the buds and does not recur for several years. Apple codlin used to be a serious pest but is now more readily controlled by modern insecticides. Red spider mites are a more serious problem and necessitate frequent changes in the insecticides used to avoid a build-up of resistant strains.

Apple thinning

Thinning of the crop to ensure good size is regarded as essential. Various methods are used, including DNC (Elgetol) during bloom followed when the set can be seen to be heavy by Sevin, applied two weeks after petal fall. Even such treatment is followed, where necessary, by hand thinning. Depending on the set, spacing by hand is done to singles or doubles. The work of hand thinning is mainly done by school children employed during their summer holidays, which start in early June.

Harvesting

The apple harvest in the Okanagan valley starts about mid-September and continues in the later areas up to early November. Occasionally picking is still being done when the first snow falls. Good colour is dependent on cooler weather in autumn and if the temperatures remain high the result is poor quality. Picking over is sometimes done with the early fruit. Picking is carried out either by migrant labour or workers from local towns. Migrant pickers are generally housed on the farms. Bulk bins are now used to harvest over 95 per cent of the apples in the valley, having been adopted very rapidly following their introduction from New Zealand. The standard bins measure 43 in. by 48 in. by 24 in. deep and hold about 25 loose bushels, or approximately one bushel for each inch of depth. The bin most commonly used has plywood sides and ventilation at the junction of these with the floor, similar to the Simven type. Some growers use bins with spaced-board sides.

Packing

Packing is usually carried out by co-operatives owned by growers or commercially-run independent packing houses. The larger growers, of whom there are comparatively few, may do their own packing. For the emptying of the bins the waterflotation system is universally employed and sizing is mostly done by weight 'graders', that commonly used being the type with rotating bins. The wooden apple box has given place to the fibre-board carton with moulded trays holding 39–42½ lb net weight, according to apple size. At one time apples down to a count of 234 and 270 were packed, but owing to changed market demands normally the smallest size now is 216.

Marketing

Following a period in the 1930s when much difficulty was experienced in marketing the apple crop in British Columbia, legislation was passed in 1939 creating a British Columbia Fruit Board which was given responsibility for organizing the marketing of top fruit crops. This it did by creating British Columbia Tree Fruits Ltd. The latter is a selling organization and all tree fruits produced commercially for sale must be sold through the Board.

The work of the Board therefore covers all privately-owned, co-operative and other forms of packing houses and shipping businesses. The British Columbia Tree Fruits organization markets part of the apple crop within the dominion but production is much greater than the country can absorb and normally 46–48 per cent of the crop is exported. Markets include 36 countries in many parts of the world, including the U.S.A., the U.K., the West Indies, Scandinavian countries, Hongkong and even trial sendings to Australia. Before the war the United Kingdom took a large proportion of the apple crop but now the U.S.A. normally takes the greatest quantity. However, in 1964, owing to the small average size of the apples, the result of a dull overcast summer, more apples were sold to the United Kingdom (1,045,000 boxes) than to the U.S.A. It is of interest that the markets in the United Kingdom are considered the best outlet for small, otherwise unsaleable apples, from both British Columbia and the Western States of the U.S.A.!

In 1946 the British Columbia Fruit Growers Association formed a company—Sun-Rype Products Ltd.—to process low quality apples. This work has since been extended to cover other fruits, including peaches and apricots. The company operates three plants, two in Kelowna and one in Oliver. It now processes approximately one-third of the apple crop and in 1964 handled 35,000 tons of culls and other apples unsaleable as fresh fruit. These are made into apple sauce, apple juice, pie fillings and dried apples. In addition, apricot and peach juices are made, either alone or with added apple juice.

Conclusions

Judged by economic standards in the United Kingdom, the average orchard size in British Columbia appears to be very marginal. The facts that owners of the smaller orchards of 4–10 acres usually have some other employment and that the owners and families of the larger orchards of 15 acres and upwards themselves all work full-time on their holdings, suggest that the margin of profit may be a narrow one. However, apple yields are high, being 1,000 bushels or more per acre for the best orchards, and quality is such that the apples of British Columbia can compete successfully with those from Washington State in the markets of the United States.

The damage to orchards from winter injury, so severe in 1965 that owners of usually profitable orchards were themselves forced to take other employment, would deter growers in many other countries from continuing in business, though government aid is usually forthcoming following these disasters. In many cases replanting of trees is necessary, and to growers from England this possibility of recurring risk of damage from winter injury appears one which few would like to entertain. No doubt the continuing pioneering spirit of many of the British Columbian growers enables them to face such disasters with greater equanimity.

(The author's first article on this subject appeared in last month's issue.)

Accounting Years and Tax Years

(Companies)

G. H. Camamile and E. S. Carter

THE majority of farm accounts are made up to 5th April each year, probably because this is the tax year. Farming, however, is not like those businesses where production or trading is continuous over the twelve months, and varying seasons can make nonsense of a 5th April year end. In one year nearly all the crops may be planted by then, whilst in another planting may scarcely have started. It may be more logical to make the accounting years coincide with calendar years by making up accounts to 31st December. This date is probably as close as it is possible to get to the start of a production cycle and comes between one harvest and the start of next season's planting; only winter wheat seed for the following year and perhaps some sugar beet from the preceding year will be in the ground. There are, of course, other dates that may be suitable for arable farms—the end of June, for example, when there are no crops in store from the previous harvest and the next harvest is still growing—but the date finally chosen will depend on the many factors which must be considered by the farmer and his professional advisers.

Companies—actual basis

Since the recent tax changes, limited companies on the one hand, and individuals and partnerships on the other, are taxed entirely differently. Under the new corporation tax rules, limited companies will be taxed on the profits (as adjusted for tax purposes) earned during each year ending 31st March. If accounts are not made up to that date in each year, a straightforward apportionment is made of the adjusted profits figures for the two appropriate accounting years, as the following example shows.

Browns Farms Ltd. has its accounts made up to 31st December in each year, and its profits for the two years 1967 and 1968 are:

	£
Year ending 31st December, 1967	16,000
Year ending 31st December, 1968	20,000

Corporation tax has not yet been fixed for the years ending 31st March, 1967, 1968 and 1969, but will be charged at whatever rates are determined for these years (say, 40, 41 and 42 per cent respectively) on the profits apportioned on a time basis, thus:

For the year ending 31st December, 1967	£
$\frac{1}{4}$ × £16,000, i.e., £4,000, at 40% (y/e 31–3–67)	1,600
$\frac{3}{4}$ × £16,000, i.e., £12,000, at 41% (y/e 31–3–68)	4,920
	6,520

For the year ending 31st December, 1968	
$\frac{1}{4}$ × £20,000, i.e., £5,000, at 41% (y/e 31–3–68)	2,050
$\frac{3}{4}$ × £20,000, i.e., £15,000, at 42% (y/e 31–3–69)	6,300
	8,350

Dates of payment

If the company has been trading for several years before 6th April, 1966, it will have to pay its corporation tax on the same day as the income tax based on the same set of accounts would have been due. In the example given, therefore, the corporation tax for the calendar year 1967 would be due on 1st January, 1969, one year later, and that for 1968 on 1st January, 1970. Where there is a new company started after 5th April, 1966, the period of 'credit' from the end of the accounting period to the date of payment will usually be nine months.

(The first note in this series 'Tax in Perspective' appeared in last month's issue of *Agriculture*; a third note will appear next month)

Farm Buildings Research

The Agricultural Research Council has appointed a Standing Committee on Research Affecting Farm Buildings under the chairmanship of Mr. J. D. Alston, a member of the Council. The principal functions of the new committee will be:

(1) To identify problems relevant to farm buildings design, seeking advice from the Agricultural Departments and professional and trade organizations.

(2) To consider the effort already being devoted to these problems and relevant new work proposed by agricultural research institutes and, if intensification of effort is needed, to recommend the type, location and priorities of further investigations.

(3) To consider applications for research grants in its field and specifically to recommend grants and supervise investigations under the Experimental Farm Buildings Scheme.

The first of a series of articles on farm buildings research will appear in next month's issue of *Agriculture*.

Glasshouse Ventilation

M. Jamieson

AN efficient ventilation system is as important a part of modern glasshouse equipment as is the heating system. It is now recognized that excessive temperatures have an adverse effect on both yield and quality of all glasshouse crops. At present the recommended maximum temperature for tomatoes is 75°F and even short periods at over 80°F are believed to be damaging. During the summer months the outside temperature frequently approaches this level. Where little ventilation is practised, glasshouse temperatures can easily be 20–25 deg. F above ambient. Thus, on sunny days, outside temperatures of 50–55°F will produce glasshouse temperatures around the maximum which plants will tolerate unless some method of reducing the temperature is used. Ventilation with ambient air is the only possible method. It follows that glasshouse temperatures cannot be brought below ambient unless the ventilating air is artificially cooled.

Achieving air change

The amount of ventilation necessary to maintain glasshouse temperatures below the required maximum has been determined at 450–600 cu. ft/hr of air per sq. ft of base area of the glasshouse. This is sometimes expressed in terms of air changes per hour. In this way it can be misleading, as the required number of air changes per hour depends on the volume of the glasshouse in relation to its base area. In other words, the mean height of the structure is important in determining the ventilation requirement in terms of air changes. A glasshouse with a mean height of 10 ft requires 45–60 changes per hour, a lower house requires more, and a higher one fewer.

Natural ventilation is the most common method of achieving air change. Forced ventilation by fans is also used, but almost exclusively by flower growers. Natural ventilation takes place because warm air tends to rise. If an air outlet is placed high in a glasshouse and an inlet low down, a chimney effect will be created. This chimney effect depends on the difference between inside and outside temperatures and on the height of the glasshouse. In still conditions, warm air rising in the glasshouse leaves by the ridge vents and is replaced by colder air from low-level side-wall vents or open doors. Wind has a powerful effect on ventilation rate. The chimney effect is increased by suction caused by wind blowing at right angles to open leeward vents. If the wind arrives at right angles to a line of open windward ridge ventilators, strong down draughts will be produced. The efficiency of natural ventilation depends upon the area of ventilator opening in relation to the base area of the glasshouse. The most recent recommendation is that ridge vent opening should not be less than 1-6th of the base area. A smaller proportion of vent opening area is unlikely to be able to cope with the worst hot, still conditions likely to be experienced. Under these conditions, generous side ventilators will be a great help, especially in single-span houses. Their effect on blocks of more than three or four spans is likely to be confined to the edges. If no side vents are provided, it is wise to arrange for the ridge ventilator opening to amount to about one-third of the base area.

The need for automation

However adequate the ventilator opening may be, satisfactory glasshouse temperatures will not be obtained without automatic control. This is because of the frequency with which adjustments must be made to the vent position to take account of the rapid fluctuations of glasshouse temperature which can occur. Where conscientious attempts are made to control temperature manually, which is seldom the case, automatic control can effect a considerable saving of labour, especially at week-ends and holidays. A limited but detailed survey of three glasshouses in Bedfordshire and Hertfordshire in the summer of 1963, which was a cool year, showed that manual adjustment to the ventilators was made on average only three times a day on week days and twice a day at week-ends. On one of these houses, the ratio of ridge vent opening to base area was 1 : 30. The average excess of glasshouse temperature over ambient was 13·5 deg. F. This was an average of six occasions, on each of which the glasshouse temperature exceeded 80°F with the ridge vents fully open. A typical example of the results of manual control of ventilators on glasshouse temperature was shown by a record taken from the 1963 survey on a Saturday near the end of May. During the morning the temperature was at or below 79°F with the ventilators about half open. Just before noon the glasshouse temperature began to fall and the vents were shut at noon when the workers went home. By mid-afternoon the glasshouse temperature was 87°F. An automatic control system would have maintained the required temperature level within the limits of the ventilator opening, without manual intervention.

A number of automatically controlled and powered systems are available, each with its own characteristics and relative advantages. Ventilators may be power-operated by electric motors, or hydraulic or compressed-air cylinders. Wide-span glasshouses, without exception, have rack and pinion operation of the vents and small geared electric motors can easily be connected to this

The ventilators of a 30 ft span, 200 ft long glasshouse. The picture in the heading of the article shows an outside view of these ventilators

mechanism. Hydraulic or pneumatic cylinders lend themselves to easy connection to existing lever-operated bell crank mechanisms, with one cylinder to each line of vents. Sufficient water pressure has to be available at all times to power the cylinders, otherwise pressurizing equipment has to be installed. On a small nursery this can be expensive in proportion to the total cost of the equipment. Similarly, air-operated ventilators require a compressor which may make a small installation very expensive. As air is compressible, and the load in all cylinders on a system may not be identical, ventilator position can vary from one cylinder to another, with consequent inaccuracy in control.

Floating control

Trade literature does not always make clear which type of control is fitted to a particular ventilation system and the following brief description may be of some help to potential users. The simplest form of control (on-off) used in the great majority of heating systems is not applicable to ventilation. Its use would result in the ventilators being either fully closed or fully open and control would be no better than by manual methods. Floating control is the simplest acceptable method. This involves the use of a three-position thermostat. The centre position is the 'off' one and is the position taken up by the thermostat when the temperature has reached the desired level. On a rise of temperature above the desired level, one of the side contacts is made, causing the ventilators to begin opening. A pre-set timing device is switched on at the same time, which stops the ventilator movement after a set interval. This gives the thermostat a chance to sense any change in conditions. If no change takes place, the timer allows further ventilator movement. Eventually the movement results in the temperature falling to the desired level and the thermostat returns to the central 'off' position. A fall in temperature causes the contact on the opposite side of the 'off' position to be made, and the vents begin to close. The object of the interval timer is to prevent 'hunting', or the continual oscillation of the ventilators, by allowing the glasshouse air temperature to catch up with the ventilator movement. The problem is that different rates of heat gain require different

interval settings of the timer. The setting adopted has, therefore, to be a compromise. Floating control is the type applied to hydraulically-operated ventilators. It can also be used with electric motor systems.

Modulating control

Modulating control is technically the most suitable form for commercial glasshouse ventilation. The ventilator position is always proportional to the deviation of the actual from the desired temperature. In other words, the greater the difference between the actual temperature and what it should be, the greater will be the ventilator opening. Modulating control is achieved by a resistance thermostat coupled to an electronic circuit. The electrical resistance of a fine wire in the sensing part of the thermostat varies with temperature. A change in air temperature alters its resistance, which unbalances a circuit in the control box. This in turn closes a relay which operates the ventilator motors. Movement of the ventilators is fed back through a potentiometer, or variable resistance. This movement changes the resistance of the potentiometer. After a certain amount of movement, a new balance is achieved in the circuit in the control box and movement stops until a further change of air temperature unbalances it. Modulating control can thus cater for wide variations in the rate of change of air temperature.

On electrically-powered systems, limit switches stop the motors when the vents are fully open or closed. These may be operated from the gear box between the motor and the vent gear. One or more pairs of safety limit switches are also installed in each circuit and it is wise for these to be directly operated by the vents themselves. Thermostats for ventilator control should always be installed in aspirated screens to protect them from direct solar radiation. In bright conditions, an unscreened thermostat will invariably cause the ventilators to begin opening earlier than necessary, as the effect of direct radiation is to increase the temperature of the thermostat more than the air around it. The required day temperature will therefore not be obtained.

Conclusion

So far, adoption of automatic control of glasshouse ventilation by the industry has been slow. Statistics show that in 1965 only 1·6 per cent of the total glasshouse area had automatic control of ventilation. Most of this must be on recently-erected structures. The difficulties of applying power to many existing ventilation systems are very great, and it is as these houses are replaced by new ones, that automatic control will be more widely used.

The subject of glasshouse ventilation is dealt with in greater detail in Bulletin 115, *Commercial Glasshouses*, and Mechanization Leaflet No. 5, *Glasshouse Ventilation*.

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45. Hailsham, East Sussex

R. A. Morton

HAILSHAM is the central district of East Sussex and comprises a complete cross-section of the Weald. It stretches from Beachy Head in the south to the Heathfield Ridge in the north, and from Bexhill on the east to the River Cuckmere on the west. The only town of any size is Eastbourne, which retains its reputation as a high-class residential centre and holiday resort in spite of the appearance of a few near-skyscrapers. Hailsham is a rapidly expanding market town in the centre of the district with Heathfield, a smaller market town, in the north.

There is now virtually a continuous built-up area from Eastbourne north along the A20 to Polegate. To the east of this line are the Pevensey Marshes, an area of alluvium devoted entirely to grazing. These marshes differ from the neighbouring Romney Marsh in having a much better water supply, but the soils are generally more shallow, overlying silty clay. The soil texture and risk of flooding have always restricted arable cultivation. There is enormous scope for improvement of these grazings.

In the past an outwintered store bullock 2–2½ years old was favoured for fattening, but such cattle are no longer available in sufficient numbers. Much younger cattle are now used, and there has been some increase in sheep. Land in this area sells at £150–£200 an acre and the price is kept up by a strong demand for turf. A few pioneers have made a first-class job of reseeding, using the new technique of killing the old turf with paraquat. The technical problems of reseeding are much easier to solve, however, than the basic problem of how to turn the extra grass into cash.

To the west of the A20 are the South Downs. This area of typical chalk-land farming has been transformed in the past 20 years, and only the steep northern escarpment has defied cultivation. The farms are large, around 500 acres, but with more grass than one might expect. Barley rules supreme, although some spring wheat is grown, and winter wheat in areas of clay with flint. Few people have gone to the extremes of continuous corn growing; there is still some respect for rotations and leys form an integral part of the system. There has been some reduction in sheep and dairy cows, with a recent increase in beef suckler herds. About 2,000 acres of downland at Friston have been planted with trees and used as a water catchment area. There has always been controversy over the merits of forestry on chalk but, from an amenity point of view, this area could eventually be very attractive.

North of the Downs a flat plain is formed by relatively narrow formations of Gault Clay and Lower Greensand with a wider belt of Weald Clay. The greensand gives rise to an attractive soil, but unfortunately the area is very limited. The Gault and Weald Clays are, in general, poorly drained and difficult to work. Many farms cut across all three soil types and fields where the soil types meet often have drainage problems. The most usual size of farm is around 200 acres, with about half in corn. Some of the larger farms have given up dairy cows, but those under 100 acres remain as pure dairy farms.

Further north is the High Weald, rising to 500 feet. It consists of Tunbridge Wells and Ashdown sand with an area of Wadhurst clay in the centre. The term sand is misleading, as all these soils contain a high silt fraction which makes drainage poor. The Weald was originally forest. Most fields are small, often steep and interspersed with woods, copses and shaws. The farms are smaller, with a high proportion of all-grass dairy farms between 50 and 100 acres. These farmers have made great strides in the past 10 years in the better use of grass and there is much less reliance on bought-in feed. However, even with such an unfavourable background there is a tendency for larger farms of 200 acres or more to evolve, often through amalgamation, and become specialist corn farms.

There are many holdings which are really private residences with a few fields attached. In the past the owners have attempted to farm with pigs or poultry as a sideline, but the economic climate is now so cool that it is wiser not to try. The only solution is for a neighbour to graze young stock or dry cows. The smaller farms tend to change hands frequently and the newcomers from all sorts of backgrounds are often described as 'not real farmers'. In the past few years capital appreciation has been a more important factor than a trading profit, but this situation may change.

Heathfield was originally the centre of a chicken-fattening industry but broiler farming has taken its place and there are numerous units throughout the district. Though the area devoted to horticulture is not large, there are some very efficient producers of top fruit, vegetables and glasshouse crops.

Farming in the Hailsham district, as elsewhere, is going through a period of streamlining and specialization. If dairying is taken as an example of this process, most dairy farmers have now taken the decision to get bigger or get out. The general aim, given a labour-saving layout, is a herd of 60 cows or more looked after by one man. By the end of the year practically all herds of over 50 cows will have bulk milk tanks, and bulk delivery of feedingstuffs is following rapidly. The first moist barley silos have just appeared.

East Sussex is a very pleasant place in which to live. Perfect scenery, near the sea, and only 50 miles from London. Although the general pressures of living in the crowded South-East are beginning to be felt, one is never very far from completely rural surroundings.

FROM THE ALS

Market Modernization

P. A. Allen-Jones
Agricultural Land Service, Worcester

THE reconstruction of the Pershore Growers' Co-operative Market is an interesting example of the way assistance under the Horticultural Improvement Scheme, combined with the ready support given by members and others, can be put to good purpose. It enabled modernization of facilities to cope with the vast increase in trade and with the congestion in and around the market area, which was rapidly bringing traffic movement to a grinding halt.

Between 1909, when the Co-operative was established, and 1965 the annual turnover increased from about £4,700 to over £1 million. The buildings available were badly planned even for the traditional auction market, and the private sales area, through which the bulk of this business was conducted, was also inadequate. The remoteness of the office from these areas made supervision difficult. Loaded lorries could not be driven in because of the low eaves height of the structure, and the many roof support stanchions impeded the introduction of mechanical handling. Lorries bringing in produce in various shapes and sizes of packs had, therefore, to queue at the entrance and the produce was then manhandled to the sales area. After sale, the produce awaited removal by the purchaser or was moved in small consignments to the dispatch area for loading by hand and off-loaded in similar fashion on reaching its destination. All this led to much wastage of labour, the cost of which had to be met by the growers. Furthermore, the conditions led to a loss of speed in handling while full use could not be made of the available floor area.

The modernization undertaken in 1963 necessitated the extension of the existing private sales building by two additional spans each 54 ft × 105 ft long. This enabled the private sales hall, auction market and potato-packing area to be accommodated in one large building with offices at one end and the dispatch area at the other, thus allowing a much greater freedom of movement. Vehicles can now enter the new sales area, dividing into two streams along roadways running down either side of the sales hall. These roadways are wide enough for the vehicles to pass, so that as soon as a lorry has been unloaded it can leave the building. Produce is off-loaded direct on to pallets carried on dolleys. The resultant mobile pallet is mounted on a two-way track system. The pallet, with its unit load, passes through the sales channel and, after sale, is removed immediately to the dispatch area.

The two-way track and dollies are shown in the foreground of this photograph, with the offices in the background on the right and the vehicle entry and folding doors on the left

The pallet is then loaded on to a waiting lorry by means of a fork-lift truck and the mobile dolleys are returned to the sales area for the next pallet load (see illustration above). An incidental benefit is that the same fork-lift trucks can be used for off-loading potatoes into the flume of the potato-packing area, and also for handling produce in the auction area.

The amount of produce passing through the auction varies considerably from season to season. By siting the auction floor alongside the potato-packing area better utilization of floor space is obtained, because the through-put of produce for auction increases as that for potato packing decreases. To allow a free flow of traffic through the new building, the hydro-cooler has been sited so that as produce is withdrawn it can flow naturally into the reception end of the sales hall. The continuous flow of incoming vehicles along the roadways on either side of the sales area makes conditions extremely draughty during the winter. Electronically-controlled folding doors have therefore been installed which open automatically on the approach of a vehicle and then close behind it.

To encourage the use of pallets, a certain number are being provided by the Co-operative for hire to members. It is thought that the pallets system will be readily adopted by the growers and they will be expected, in the future, to supply their own, constructed to a standard pattern.

The provision of these new facilities should make it possible to handle an ever-increasing throughput of produce with few extra staff and lead to an improvement in quality, quicker sales and a saving in time and temper. They will also provide for the extension of co-operative marketing which is likely in the future, particularly with the introduction of compulsory grading for more produce.

Books

The Growth of Cereals and Grasses. Edited by F. L. MILTHORPE and J. D. IVINS. Butterworth, 1966. 95*s*.

The proceedings of the Twelfth Easter School in Agricultural Science, organized by the University of Nottingham in 1965, covers six main subjects dealing with the growth and development of cereals and grasses.

Crop production can be regarded as the manipulation of the physiological responses of plants within a given environment having as its objective high yields of produce of an acceptable quality. To be able to manipulate these growth responses to the best advantage, it is necessary to know something of the physiological processes within the plant and of the environmental conditions which influence them. The twenty-two papers presented here by specialists in the various subjects aim at giving a review of the present state of our knowledge and try to assess the significance of recent investigations.

Though they have been developed for widely different purposes on the farm, cereals and grasses both belong to the same botanical family, the Gramineae, and it might therefore be expected that much of what is said about the growth processes of one would apply to the other. By devoting separate chapters to each, the differences which exist between the two crops have been emphasized.

The general plan of the book follows the development of the plant. Vegetative development is the first stage and it begins with a paper on germination and seedling emergence. Reproductive development, from its early beginnings to the ripening of the grass seed or cereal grain, forms the next section. This is followed by papers on the plant environment covering the microclimate immediately surrounding the crop, the soil and the influences of competing neighbouring plants. A paper on root growth, to which too little attention has been paid hitherto, is also included.

Logically enough, the plant's responses to its environment are next discussed with papers on the effects of light, temperature, water and mineral nutrition. There is a particularly interesting paper on the physiological aspects of regrowth following defoliation by grazing or cutting. Quality, a subject of increasing importance in the grasses and the cereals, is reviewed in its biochemical aspects.

The final section, entitled 'Agronomic Aspects', summarizes the application of our knowledge of growth responses to management in the field, and to the breeding of better varieties of cereals and grasses.

There is an interesting reference to the use of a small number of indicator cows of potentially high-yielding capacity to show what can be achieved from grassland; levels of concentrate feeding for the others can then be adjusted accordingly.

The editors are to be congratulated on a comprehensive range of well-selected papers. As a reference book reviewing the latest researches in an important field, this account of the growth of grasses and cereals is most useful to those who are interested in the basic factors in crop production.

F.R.H.

The Agricultural Revolution 1750-1880. J. D. CHAMBERS and G. E. MINGAY. Batsford, 1966. 45*s*.

Not so long ago, agricultural history was in the hands of the academic equivalent of the Home Guard. Now it is firmly under the control of professional scholars, whose detailed researches are steadily modifying, developing and, on occasion, overthrowing traditional doctrine. This book reflects this change. It is the first general account of this crucial and fascinating period to incorporate the new knowledge now available and, significantly, it is intended primarily as a text-book for students and their teachers. In terms familiar to present readers, research has now reached a stage when its findings can be presented in popular, advisory form.

The new order in scholarship has dealt drastically with the inherited views of the earlier years of the Agricultural Revolution. Thus, it is clear that the 'Old Farming' was considerably more adaptable and progressive than was once imagined. Indeed, the movement towards compact and individually-managed farms was well advanced

before the enclosures speeded and completed the process. Neither were the enclosures the true begetters of the rural misery for which they are traditionally blamed. The main cause of this was the striking growth of population and the consequent increase of landless, and frequently workless, labourers in the villages. Coke, too, loses his legendary pre-eminence and is reduced in status from a transformer to an improver. But the men of the 'High Farming' stand their ground better for, on the whole, the new evidence confirms the Victorian story. In this section we are given more information rather than radically new ideas.

This is first-class documentary history—comprehensive, balanced, admirably referenced; a lucid and coherent summary of a vast and miscellaneous mass of material. But it has the defects as well as the merits of this type of scholarship. Thus, emphasis on recent research seems to have distracted attention from the literature of the time. For example, it is said that the mangel was introduced in the middle of the nineteenth century. In fact, it was introduced in 1786. The point may not be very important, but it suggests that the authors are not too familiar with such contemporary sources as the *Correspondence of the Bath and West Society*.

More serious, perhaps, is the failure to give technology and the men who served it their due. We are told a good deal about the Victorian estate-managers, but little about the rise of the technical professions, divorced from the ownership or occupation of farmland, on whom they came increasingly to depend. This important development is classically illustrated by the generations of the drainers, each man a step further from the farm—Elkington, the farmer with a flair; then Smith, the farmer turned engineer; and finally Parkes, the mill-trained engineer. But none of these names appears in this book; neither will the reader who wishes to understand, say, why Davy and Curtis failed and Lawes and the Lawsons succeeded, find much help in its pages.

This weakness will limit the book's impact on a technically-trained generation of agricultural readers whose future lies increasingly not on the farm but in the professions and industries which serve the farm. But it would be more than unfortunate if it discouraged them from reading it. For in all other respects the authors have succeeded in their aim of providing a 'useful, stimulating and valuable' survey of the most important period in our farming history.

N.H.

Phosphates in Agriculture. VINCENT SAUCHELLI. Chapman and Hall, 1966. £5.

Yet another addition to the writings from the prolific pen of Vincent Sauchelli, this volume, as usual, contains a wealth of information.

Sauchelli has set himself the task of collecting together facts, figures and views on the role of phosphorus in the agricultural industry in its widest context. From a first chapter devoted to the chemical properties of phosphorus, the reader is introduced to the distribution of phosphate ores and their exploitation by man. Information on the role of phosphorus in soils and plants follows. Phosphate fertilizers then receive attention—interspersed with chapters on phosphate fixation and soil management practices. A rather curious miscellaneous section precedes the chapter on the role of phosphorus in animal nutrition. Finally, the book reviews some of the methods of chemical analysis for phosphorus in soils and fertilizers but not plants. Facts and figures of phosphate fertilizer production are included and there is also a useful bibliography.

Sauchelli is primarily a consultant to the fertilizer industry and this reveals itself time and again throughout the book. We are always kept aware of the important role which the production of phosphatic fertilizers plays in agriculture, and it is those chapters devoted to the production and use of these materials which are the most informative and most readable. On other aspects great care is taken to present views from the opposing schools of thought and the reader is left to make up his own mind.

It is indeed pleasing to read an American book in which generous references are made to the rest of the world although, of course, the majority of the data is drawn from the Americas. On the debit side, however, the chapters appear to have been written as separate essays and subsequently strung together in book form. This gives the reader a rather disjointed impression not helped by a number of instances of repetition. The selection of chapter order in the book could also be improved. It would seem logical to continue the theme of phosphate rock (chapters 2 and 3) with the chapters on phosphate rock and fertilizers (6) and granular phosphate fertilizers (8). Instead this is broken up by phosphate in soils (4), plants (5) and soil fixation of phosphates (7)—itself separated from phosphorus in soils. This twisted order can best be illustrated by pH, to which frequent reference is made throughout the book. Yet an explanation of pH is not to be found until page 209.

In his foreword Sauchelli states 'the purpose of the book is primarily to serve the requirements of the ordinary man and not those of the scientist and technician'. While the ordinary man will find a number of chapters fascinating reading, for much of the book a more profound knowledge, particularly of chemistry, will be required. For this reason *Phosphates in Agriculture* is more likely to be found on the bookshelves of the student and technician in the fertilizer industry than on those of the ordinary farmer.

G.R.D.

The City Man's Guide to the Farm Problem. WILLARD W. COCHRANE. University of Minnesota Press. London: Oxford University Press, 1966. 40*s*.

The author describes how the trend in modern U.S. agriculture is for two types of farming to develop—the highly-productive commercial units and the low-producing farms. The former are increasing in size and number and the latter going out of business. Between 1949 and 1963, 1,100,000 modern farmers left the land, about 2·4 per cent each year. The family farm of an adequate size., i.e., employing 1·5 men, has proved efficient and the numbers have doubled in the decade up to 1960. The bigger farms, during the same period, have remained relatively constant in numbers.

During the past ten years the American farm economy has felt the full force of the technological revolution, and although the numbers employed in farming have fallen by about 25 per cent, output has increased by 20 per cent. This increase in output has not depressed farm prices to the extent that would have occurred in a free market because of the price support programmes. The author estimates that if Government support was withdrawn, farm prices would slump by 50 per cent for several years.

Over the past 25 years, the productivity of American farms has risen steadily in that inputs have hardly increased but outputs have expanded enormously. Despite this the country continues to be faced with chronic surpluses of food and fibre. The Commodity Credit Corporation has bought much of the excess, some of which has been stored and some disposed of on the domestic market. Another arm of the Government, under Public Law 480, has sold considerable quantities at concessional prices to emerging countries.

These schemes have not solved the surplus problem. Because the demand for food by the consumer is inelastic—an increase in consumption of 2 per cent would mean a 10 per cent decrease in retail and a 20 per cent decrease in farm prices—there is little prospect of getting rid of the surplus on the domestic market. In view of this, Mr. Cochrane poses the question as to whether an advanced society is right in devoting so much of its resources to research and accepting unquestionably the results of advanced technological processes in agriculture. The results are not only cheap and abundant food but also burdensome and expensive surpluses and a widening gap between the commercially capable and the less successful farmers. There is a real problem of rural poverty in the U.S.A. It is estimated that 1·6 million farm families live in poverty, and despite several Government schemes over the past 30 years to alleviate their lot the problem remains. An expensive programme of education in rural areas plus the creation of jobs for those who have been trained is advocated as the solution.

This is a well-documented book which traces the development of agriculture in the U.S.A. over the past 30 years. It looks to the future and suggests possible remedies. But this valuable information could have been compressed into 150 rather than 230 pages without loss of clarity.

M.W.T.

The Lily Year Book 1966. Royal Horticultural Society. 15*s*. (by post 17*s*.)

The fascination of lilies is age-old; the intensity it has reached today, due to an unprecedented speed of development and the surpassing beauty of many new forms, is clearly reflected in the 1966 Lily Year Book.

The earlier excitement of collecting new species persists even at present, and this volume covers lilies in the Caucausus, Kingdon Ward's Chinese discoveries, and lilies seen in the San Bernadino mountains. But the scene is dominated by the wealth of new hybrids, especially those of Jan de Graaff, to whom this volume is dedicated, and Woodriff's 'Black Beauty'. Our own leading hybridizer, G. W. Darby, gives a full account of his intensive work in Hertfordshire. This and a check list, albeit American, of hybrids and species indicating floral characters and time of flowering greatly clarify the lily world for those still rather bewildered by so many recent introductions. Accounts of the performance of all these lilies in gardens throughout the world show the global interest now taken

in these flowers, an interest which the Lily Group has done so much to foster.

Lilies also fascinate the horticulturist by the challenge they offer; they are elusive and 'difficult'. All growers crave more cultural knowledge, and to meet this transplanting and vegetative propagation are the aspects chosen for discussion this year in contributions by two authorities, G. H. Preston and J. Newell.

People unable to grow lilies themselves are now quick to buy colourful hybrids as cut flowers or pot plants. An account by the director of the Lee Valley Experimental Horticulture Station on the production techniques being evolved there indicate the opportunities now being opened up for commercial growers.

The customary articles on some related plants include this year one on Alliums for the garden—a most useful index—and others recording botanical data concerning the genera *Muscari* and *Fritillaria* in Iran and Afghanistan.

To complete the wide range of interests covered, accounts are given of the magnificent lily show staged in July, 1965, and of visits to gardens by the Lily Group. There is also a catalogue of newly-registered lily names. The book is well supplied with illustrations; all are good and some of the colour plates are of quite exceptional merit.

K.H.J.

A Suffolk Calendar. ALLAN JOBSON. Robert Hale, 1966. 21*s*.

This is yet another record of life of the Suffolk countryside. There is no narrative. It is a bedside book which really needs no marker and you can please yourself where you start to read. Allan Jobson takes you through the seasons, recalling the local festivals, customs and traditional beliefs. Between the dates he weaves in humorous and interesting tales for which he has an eye as he turns over dusty pages. The funeral of Sir John Paston at Bacton in 1466 is a wonderful account of a great local event and 'the reke of the torches at the dirge was so great that the glaziers had to remove two panes to permit the fumes to escape' is sufficient to recapture the scene. I like, too, the St. Edmunds Bury company of spiders which 'marched together and in a strange kind of order'.

The book also has a deal of information which could have been extracted from newspapers, and Jobson's selections have a human interest. The story of Bright, the Maldon grocer who weighed 44 stones at the age of thirty, conjures up the problems of the living and the dead. His coffin, which was 3 ft in depth, was lowered into the grave by an engine.

The collection of East Anglian bird names are interesting and more genuinely local than the flower names, many of which are common elsewhere. *A Suffolk Calendar* musters a miscellany of tales and beliefs which will pass into unrecorded history and for this reason it is worthy of the light reading which it affords.

P.J.O.T.

Poultry Keeping in Schools. M. BARON. Pergamon Press, 1966. 12*s*. 6*d*.

This book contains information necessary for the management of a small poultry unit in a secondary modern school. It is not intended to be a text-book on poultry keeping but it suggests exercises which may be extended into the English, arithmetic and science classrooms. With this in mind it is unfortunate that the text was not checked more carefully as there are a number of spelling, punctuation and grammatical errors.

The general layout is good and each chapter is followed by an assignment which is designed to give students practical experience of poultry keeping. However, the suggestion that they should hatch a dozen Legbar eggs could prove rather frustrating as this breed has almost disappeared. This apart, the assignments are well thought out and obviously aimed at increasing the child's powers of observation.

Some of the technical information may be queried. A day length of 13–14 hours is mentioned, whereas the normal recommendation is a maximum of 17 hours. Broilers are said to be marketed at 12–14 weeks of age instead of 8–9 weeks, and it is also suggested that they are caponized. Throughout the book recommendations on floor space allowance are given as 'feet square' instead of 'square feet', and this may be rather misleading to the student.

The author attempts to go into some detail on such topics as nutrition, embryology and genetics. Of necessity, he has to be superficial and it would probably have been better to steer clear of some of the scientific terminology. These are minor criticisms, however, as one of his main objects is to provide a basis on which students can build by virtue of their own observations, and the book should prove a useful tool in all Rural Science Departments where poultry are kept.

M.M.

Forty-Sixth Annual Report of the Forestry Commissioners for the year ended 30th September, 1965. H.M.S.O., 1966. 9*s.* 6*d.* (by post 10*s.* 1*d.*)

Aspects of Rural Development. Thirty-second Report of the Development Commissioners for the three years ended 31st March, 1965. H.M.S.O., 1966. 5*s.* 6*d.* (by post 5*s.* 11*d.*)

Agricultural Research Council. Report for 1964-65. Institute of Animal Physiology, Babraham, Cambridge, 1966. 10*s.*

John Innes Institute. Fifty-Sixth Annual Report, 1965. 3*s.* from Bayfordbury, Hertford.

Food and Agricultural Statistics. A Chartbook for the United Kingdom. S. Robson. Department of Agricultural Economics, University of Newcastle upon Tyne, 1966. 21*s.*

National Research Development Corporation. Seventeenth Report, 1965-66. H.M.S.O., 1966. 4*s.* 6*d.* (by post 4*s.* 11*d.*)

Department of Hop Research. Annual Report, 1965. Copies may be obtained from the Secretary, Wye College, near Ashford, Kent, price 6*s.*

The Ministry's Publications

Since the list published in the September, 1966, issue of *Agriculture* (p. 443) the following publications have been issued.

MAJOR PUBLICATIONS

Bulletin No. 170. Diseases of Sheep (Revised) 5*s.* (by post 5*s.* 6*d.*)

ADVISORY LEAFLETS

(*Price* 4*d. each—by post* 7*d.*)

No. 71. Colorado Beetle (Revised)

No. 187. Woolly Aphid (Revised)

No. 199. Wireworms (Revised)

No. 310. Fluke and Liver Rot in Sheep (Revised)

MECHANIZATION LEAFLETS

No. 9. Sugar Beet Harvesting (New) 1*s.* (by post 1*s.* 3*d.*)

No. 11. Farm Seed Cleaning and Grading Machinery (New) 1*s.* (by post 1*s.* 3*d.*)

No. 12. Control of Air Conditions in Horticultural Stores (New) 1*s.* 6*d.* (by post 1*s.* 9*d.*)

FREE ISSUES

Grants for Growers—Horticultural Improvement Scheme (Revised)

STL No. 14. Chemical Weed Control in Bush and Cane Fruits (Revised)

STL No. 15. Chemical Weed Control in Top Fruit Orchards (Revised)

The priced publications listed above are obtainable from Government Bookshops (addresses on p. 508), or through any bookseller. Unpriced items are obtainable only from the Ministry (Publications), Tolcarne Drive, Pinner, Middlesex.

AGRICULTURAL CHEMICALS APPROVAL SCHEME

Since the publication of the 1966 List, the following product has been approved.

MISCELLANEOUS

METHAM SODIUM
Liquid Formulations
Campbell's Metham Sodium—J. D. Campbell

Company Information

Amoco (UK) Ltd. have changed their address to Park House, Park Street, London. W.1 (Hyde Park 6070).

J. M. Stokes Ltd. now trade as Stokes Bomford Ltd.

Synchemicals Ltd. have changed their telephone number to Bermondsey 1959.

Universal Crop Protection Ltd. are now at Nicholson House, Nicholson's Walk, Maidenhead, Berkshire (Maidenhead 29933).

Additions to 'Chemicals for the Gardener'

I.T.P. MERCURATED MOSS KILLER
Based on calomel with iron sulphate—Internationa Toxin Products Ltd.

I.T.P. SLUG PELLETS
Based on metaldehyde—International Toxin Products Ltd.

SELEX
A lawn weed-killer based on dichlorprop and 2, 4-D—Fisons Horticulture Ltd.

SELEX SPOT WEEDER FOR LAWNS
An aerosol form of Selex (*see above*)—Fisons Horticulture Ltd.

TOPGLASS SMOKE
Based on BHC and tecnazene—Pan Britannica Industries Ltd.

TOPGLASS SOIL FUNGICIDE
Based on nabam. For the control of tomato and chrysanthemum root rots and damping off in greenhouse borders and potting soils—Pan Britannica Industries Ltd.

Change of Address

International Toxin Products Ltd. have changed their address to Paper Mill Lane, Bramford, Ipswich.

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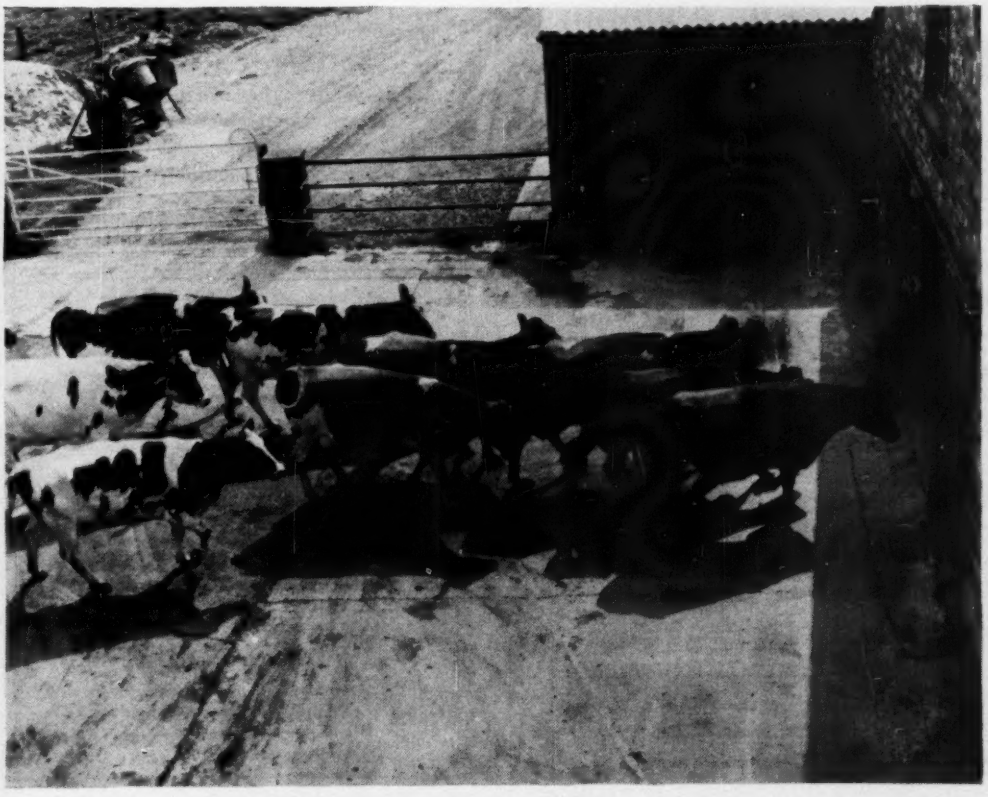

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OFFICIAL APPOINTMENTS

PLANT PHYSIOLOGIST
TANZANIA
(TANGANYIKA AND ZANZIBAR)

Required to study the life processes of plants of economic importance and to correlate his/her findings to the problems of crop production. The work would involve liaison with the horticulturist and plant breeder.

Candidates must have a degree in botany with specialisation in plant physiology. Field experience with tropical plants is desirable.

Salary scale £1,329—£2,757 a year plus 25% terminal gratuity. Passages provided. Education allowances. 21 to 27 months' contract. Generous leave.

Candidates, who should be nationals of the United Kingdom or the Republic of Ireland, should apply for further details giving full name and brief particulars of qualifications and experience, quoting RC 213/173/021 to:

Appointments Officer,
Room 301,
MINISTRY OF OVERSEAS DEVELOPMENT,
Eland House, Stag Place,
London S.W.1.

AGRICULTURAL OFFICERS
MALAWI

Required to prepare regional extension programmes and assist subordinate extension workers to carry out these programmes; to be responsible for interpreting research results and for passing the information in a suitable form to extension workers. These vacancies cover several branches of agricultural activities.

Candidates must hold a degree in Agriculture.

Salary scale £1,485—£2,600 a year, plus 15% terminal gratuity for up to 30 months' service and 25% gratuity for a longer period. A supplement of £100 per annum is also payable to an Officer's bank account outside Malawi and Rhodesia. Passages provided. Education allowances. Two to three year contract. Generous leave.

Candidates, who should be nationals of the United Kingdom or the Republic of Ireland, should write for further details, giving full name and brief particulars of qualifications and experience, quoting Ref. RC 213/134/02, to:

Appointments Officer,
Room 301,
MINISTRY OF OVERSEAS DEVELOPMENT,
Eland House, Stag Place,
London S.W.1.

AGRICULTURAL OFFICERS
(ANIMAL HUSBANDRY)
TANZANIA

Required to study the distribution of livestock breeds and to advise farmers on the improvement of animal husbandry.

Qualifications: Candidates must have a university degree with animal husbandry as a major subject and an aptitude for work involving animal production and nutrition. A knowledge of the distribution and feeding values of different grasses and an ability to speak Swahili is desirable.

Salary: In the range £1,329—£2,757 a year plus a 25% terminal gratuity. 21–27 month contract. Government quarters. Education allowances. Generous leave.

Applicants, who should be nationals of the United Kingdom or Republic of Ireland, should write for further details, giving full name and brief particulars of qualifications and experience quoting RC 213/173/025 to:

Appointments Officer,
Room 301,
MINISTRY OF OVERSEAS DEVELOPMENT,
Eland House, Stag Place,
London S.W.1.

PLANT PATHOLOGIST
TANZANIA
(TANGANYIKA AND ZANZIBAR)

Required for duty at a regional research centre to conduct research on plant diseases and to advise on their control. Travelling to carry out crop inspection and give on the spot advice may be entailed.

Candidates must have a Natural Science degree with specialisation in plant pathology. Previous research experience is desirable.

Salary scale £1,329—£2,757 a year plus 25% terminal gratuity. Passages provided. Education allowances. 21 to 27 months' contract. Generous leave.

Candidates, who should be nationals of the United Kingdom or the Republic of Ireland, should apply for further details, giving full name and brief particulars of qualifications and experience, quoting RC 213/173/08 to:

Appointments Officer,
Room 301,
MINISTRY OF OVERSEAS DEVELOPMENT,
Eland House, Stag Place,
London S.W.1.

OFFICIAL APPOINTMENTS

NIGERIA

The GOVERNMENT OF NORTHERN NIGERIA invites applications for the following vacancies in the Ministry of Agriculture. APPOINTMENTS made on CONTRACT BASIS for two tours of from 18–24 months each in the first instance.

1. **Agricultural Officers:** Applicants must possess degree in Agriculture or Horticulture plus at least 2 years post-graduate training. *Salary* from £1,206—£2,202 p.a. according to post-qualification experience. Those with higher qualifications and many years' experience may be appointed as SENIOR or PRINCIPAL AGRICULTURAL OFFICERS. *Salary* from £2,376—£2,532 p.a. according to post-graduate experience.

2. **Produce Officers:** Candidates must have a degree or Diploma in Agriculture or Economics *or* considerable experience in produce trade. *Salary* from £942—£2,046 p.a.

3. **Specialist Superintendent (Horticulture):** Candidates should have degree in Horticulture *or* have completed recognised course or Diploma in Horticulture, *or* have had approved horticultural experience. *Salary* from £942—£2,046 p.a.

4. **Agricultural Superintendent (Mechanical):** Applicants should have had 3 years' experience in a Mechanical Engineering works and have had experience of all types of agricultural tractors and implements. *Salary* from £906—£1,926 p.a.

5. **Agricultural Superintendent (Soil Survey):** Applicants must have degree in Agriculture, Geography, Geology, Soil Chemistry or Botany with geological bias. *Salary* from £942—£2,046 p.a.

6. **Fisheries Superintendent:** Applicants should have successfully completed a recognised Fisheries course or have approved experience in FISHING INDUSTRY. *Salary* from £906—£1,926 p.a.

7. **Fisheries Officer:** Applicants must have degree in Biology with emphasis on Zoology, preferably including some work on fish. *Salary* from £1,104—£2,202 p.a.

8. **Irrigation Engineers:** Candidates must have degree in Civil Engineering plus at least 5 years' post-graduate experience in this field. *Salary* from £1,104—£1,878 p.a.

9. **Agricultural Engineers:** Applicants must possess B.Sc. Agric. Engineering or B.Sc. Agric. with Diploma in Agric. Engineering A.M.I.Mech.E. with agricultural experience or A.M.I.C.E. with mechanical bias including agricultural experience would also be acceptable. *Salary* from £1,104—£2,202 p.a. Those with higher qualifications and many years' experience may be appointed as SENIOR AGRICULTURAL ENGINEERS. *Salary* from £1,944—£2,568 p.a.

Important: In addition to these salaries a supplementation, generally tax free, of £500 p.a. may be payable by the British Government to nationals of the U.K. or the Republic of Ireland.

Other Benefits Applicable to all Posts:

Allowance for up to 3 children below the age of 18 of £120 p.a. for one child, £216 for two children and £288 p.a. for three. Baggage Allowance of £15 each for Officer and wife on every flight to Nigeria. Camp Equipment Allowance of £40 (in most cases) and Clothing Allowance of £45 (if basic salary does not exceed £1,746 p.a.) both payable once on first appointment. *Gratuity* of £100 or £150. *Leave* on full pay at the rate of 5 or 7 days per month of service. *Free passages* to and from Nigeria on appointment and on leave. *Free Medical* and *Dental Treatment* for Officer and family. *Accommodation* provided at nominal rent.

Further information and application forms can be obtained from:

The Recruitment Officer,
Northern Nigeria Recruiting Agency,
Nigeria House, 9 Northumberland Avenue,
London, W.C.2.

ANIMAL NUTRITIONIST

East African Agriculture and Forestry Research Organisation

Required to investigate metabolism of tropical and temperate type cattle with a tropical environment.

Candidates should possess a degree in Agriculture with post-graduate training or experience in biochemistry or agricultural biochemistry.

Appointment on contract for one or two tours of two years. Salary scale £1,221—£2,808 a year. A 12½% increase in salaries has been approved. 25% terminal gratuity. Education allowances. Passages provided. Generous leave. Government quarters.

Applicants, who should be nationals of the United Kingdom or Republic of Ireland, should apply for further details giving full name and brief particulars of qualifications and experience, quoting RC 213/214/016 to:

Appointments Officer,
Room 301,
MINISTRY OF OVERSEAS DEVELOPMENT,
Eland House, Stag Place,
London S.W.1.

CITRICULTURIST/HORTICULTURIST

GAMBIA

Required to plan and execute the commercial production, processing and marketing of limes on a pilot project basis; to develop subsistence vegetable growing and to assist in poultry improvement.

Qualifications: Candidates must have a degree or diploma in horticulture or agriculture with considerable practical experience of the duties outlined above, preferably in the tropics, and an ability to conduct rootstock, fertilizer and cultural trials. Experience in the maintenance of records would be an advantage.

Salary: In the range £1,140 to £2,224 per year depending on experience. 25% Gratuity. Free passages. Education allowances. Generous leave. On contract for two tours of 15–18 months.

Candidates, who should be nationals of the United Kingdom or the Republic of Ireland, should apply for further details giving full name and brief particulars of qualifications and experience, quoting RC 213/68/09 to:

Appointments Officer,
Room 301,
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OFFICIAL APPOINTMENTS

PLANNING OFFICERS
ZAMBIA

Required to take charge of field planning teams and to be responsible for regional conservation planning on a catchment and/or settlement plan basis.

Candidates must have a degree in agriculture or natural science, preferably with post-graduate training and/or experience in the use of aerial photography, practical surveying and land use planning.

Salary scale £1,180 to £2,600 a year plus 25% gratuity. A supplement ranging from £200 to £300 a year is also payable direct to an officer's bank account in the United Kingdom or the Irish Republic. Passages provided. Government quarters. Generous leave. Education allowances. Three years' contract.

Candidates, who should be nationals of the United Kingdom or the Republic of Ireland, should write, giving their full name and brief particulars of their qualifications and experience, quoting RC 213/132/020 to:

Appointments Officer,
Room 301,
MINISTRY OF OVERSEAS DEVELOPMENT,
Eland House, Stag Place,
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AGRICULTURAL OFFICERS
TANZANIA

Required to demonstrate improved agricultural practices in conjunction with the research services and to control technical staff. To initiate policy and report on programmes for agricultural development and estimate crop production. To administer government funds and stores.

Candidates must hold a degree in Agriculture. A knowledge of Swahili and experience in tropical agriculture is desirable.

Salary scale £1,329—£2,757 a year plus 25% terminal gratuity. Passages provided. Education allowances. 21–27 months' contract. Generous leave. Government quarters.

Candidates, who should be nationals of the United Kingdom or the Republic of Ireland, should apply for further details, giving full name and brief particulars of qualifications and experience, quoting RC 213/173/01 to:

Appointments Officer,
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Eland House, Stag Place,
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OFFICIAL APPOINTMENT

AGRICULTURAL ENGINEER
ZAMBIA

Required as an extension specialist in agricultural mechanisation with specific responsibilities for training.

Candidates must possess a degree in either agricultural or mechanical engineering. If the latter, post-graduate qualifications in agricultural engineering will be essential. Field experience in agricultural engineering with particular emphasis on farm machinery is desirable.

Salary scale £1,255—£2,600 a year plus 25% gratuity. A supplement ranging from £200 to £300 a year is also payable direct to an officer's bank account in the United Kingdom or the Irish Republic. Passages provided. Education allowances. Government quarters. Generous leave. Three years' contract.

Candidates, who should be nationals of the United Kingdom or the Republic of Ireland, should write giving full name and brief particulars of qualifications and experience, quoting RC 213/132/028 to:

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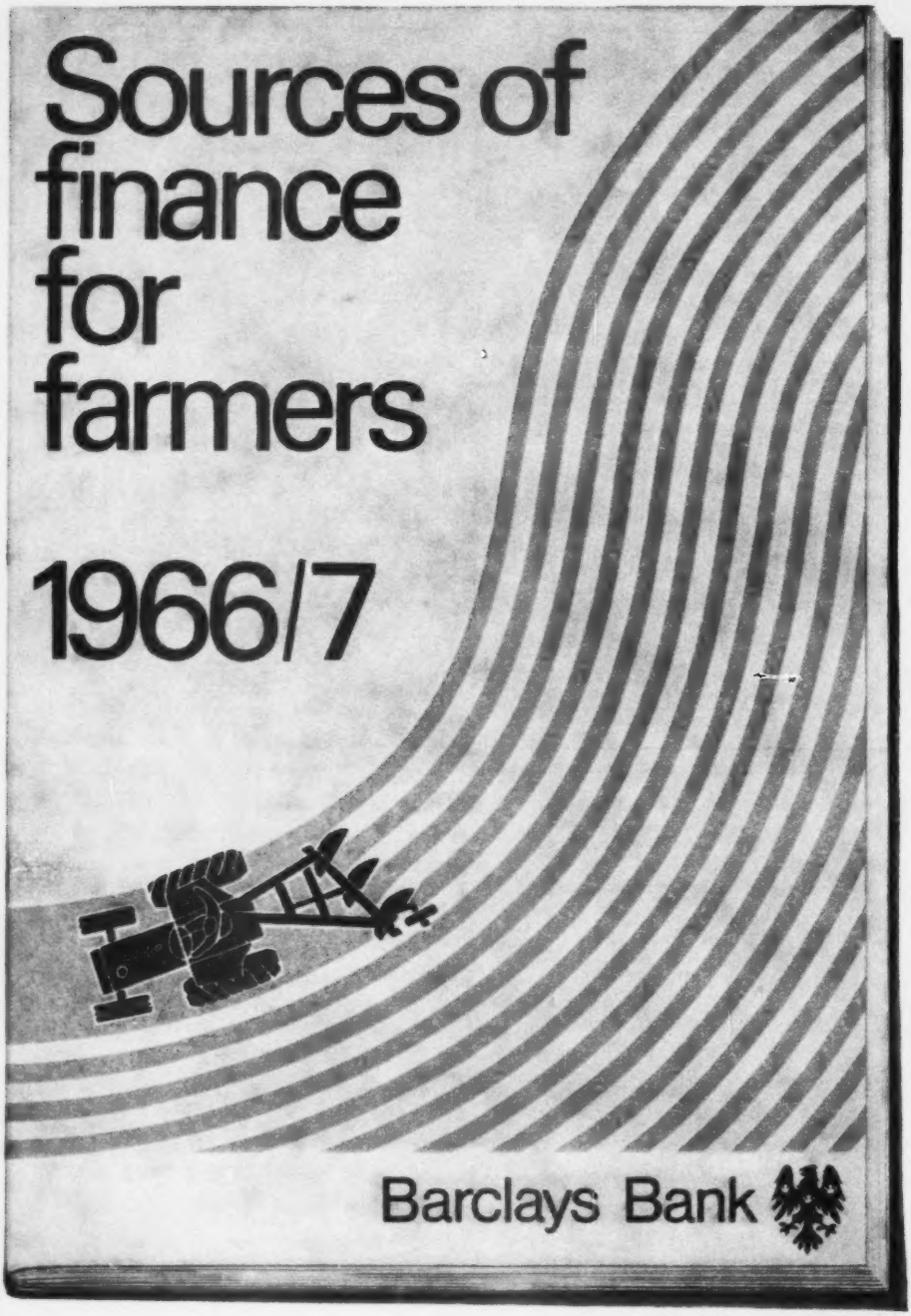

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